THE IRON TRADE REVIEW

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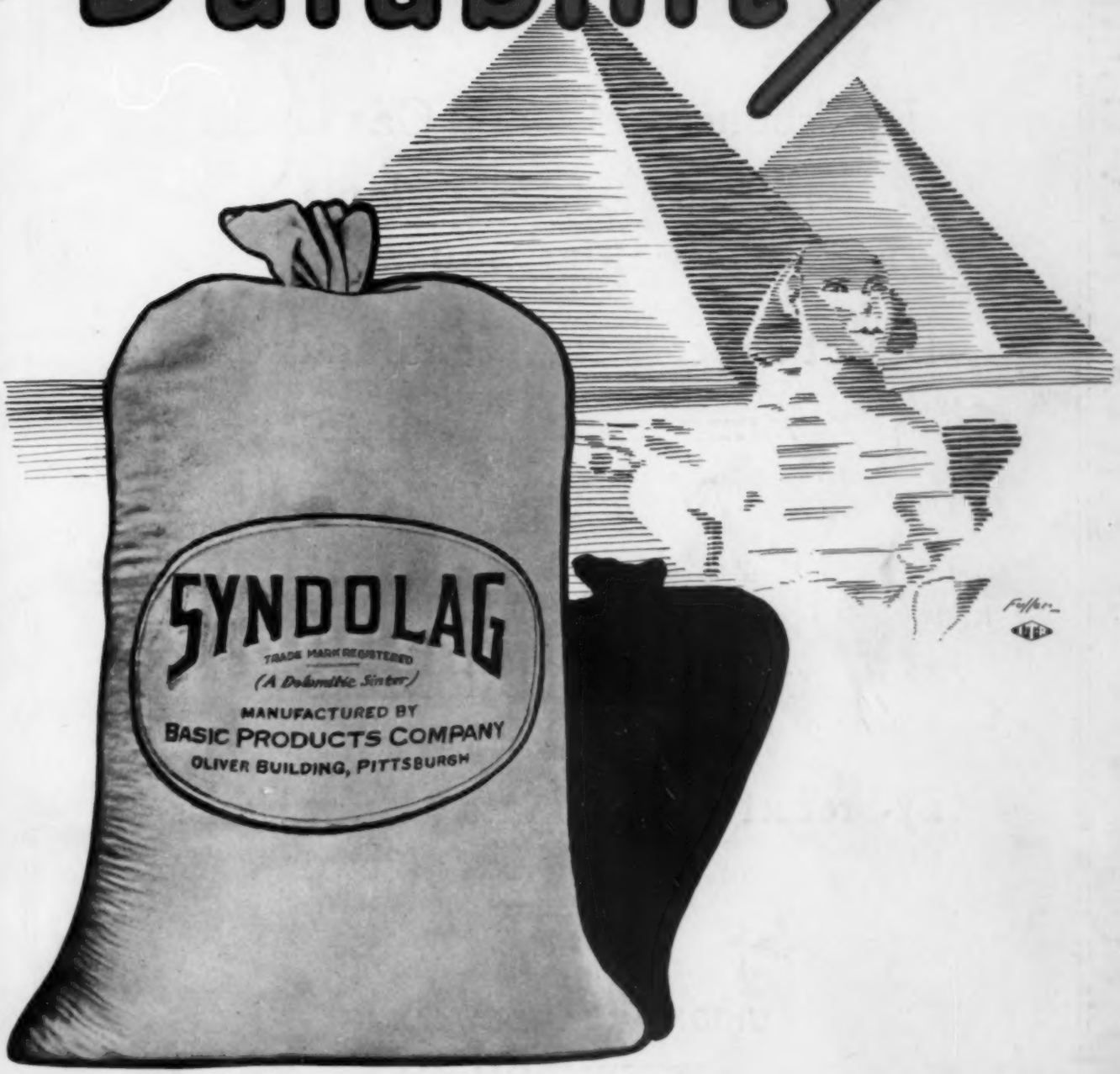

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UNION ARCADE BUILDING
PITTSBURGH, PA.

THE IRON TRADE REVIEW

Vol. LXII Cleveland, January 17, 1918 *No. 3*

Struggle Hard to Restore Output

Iron and Steel Makers Making Slow Progress to Overcome Operating Situation of Unparalleled Severity—Iron Shortage More Menacing—Fabricators Repudiate Shape and Plate Contracts and Sharp Controversy Develops

SLOW progress is being made in repairing lines of iron and steel production shattered by two weeks of the worst operating conditions in the history of the industry. The past week's blizzard, sweeping over most of the principal industrial districts, has piled up the already appalling loss of tonnage previously resulting from the tangle of shipping at critical points. Sorely needed consignments of coal and coke are being pushed through the congestion of freight, but it will require some days even under favorable weather conditions, to bring output to a stable level. The Chicago district, which has been the center for recurrent storms of unusual severity, is hard-put to overcome the worst blockade since iron and steel making became a major industry in that territory. Scarcely a wheel has been turning at Gary, South Chicago, Indiana Harbor and Joliet. The Illinois Steel Co. has had 20 out of 28 blast furnaces out or banked, due to fuel shortage. Independent companies have suffered in equal measure. These conditions virtually have been duplicated at Cleveland, Pittsburgh and Youngstown. The Carnegie Steel Co. has reduced its idle furnace list from 20 to 16. Sheet mill output has dropped to a little more than 50 per cent. Many coke plants in the Connellsville region have been on a half-production basis.

Iron Shortage Is Menacing

The demoralizing situation for efficient and sustained blast furnace operations has brought the menace of pig iron shortage more sharply into view. The intermittent banking of furnaces has destroyed both tonnage and quality output and the yield of off-iron has been heavy. As an outgrowth of the conditions of the past two weeks, the statement is made on competent authority that virtually not a merchant company in the country, outside of the south, is likely to be able to show a profit for the month of January. The fact that the average billing price for many producers still is under the government-fixed prices, enters into this estimate. While the promulgated condition that new contracts are subject to price revision on deliveries subsequent to March 31, continues to chill the desire to sell for the future, notable exceptions have appeared. Certain Ohio and western Pennsylvania producers have taken on large bookings for the last half, largely from regular customers with war contracts. A northeastern Ohio steelmaker, who inquired for 50,000 to 60,000 tons of basic to Jan. 1, 1919, has made large purchases. A leading Youngstown steelmaker has bought iron to recoup losses from recent shutdowns. Inquiry of malleable users in the middle west has totaled many thousands and some good-sized orders have been closed. About 8000 tons of mixed grades for the 1918 requirements of the navy yards are pending.

Several plans to pool and distribute coke supplies have been put up to Washington. One of them contemplates the furnishing of fuel only to those stacks with the lowest consumption. If carried out, this would force the cessation of a considerable number of furnaces.

Finished Steel Buying Light

Fresh demand for finished steel, apart from government requirements, has remained so moderate that some of the smaller mills are becoming more concerned as to bookings. The increase of 484,612 tons in the Steel corporation's unfille orders in December is ascribed largely to reduced shipments enforced by recent shipping and operating difficulties. Only in exceptional cases are producers disposed to enter into formal contracts. The implement trade is being accommodated more freely in this way for first quarter. One large independent is understood to have entered the new year without a single outstanding contract. Extensions of tonnage not taken out on contracts expiring Jan. 1 continue to be made by important producers. In some cases these extensions have run to three months. A tense situation has developed in structural shapes and in a less degree in plates where numerous fabricators are refusing to accept tonnage placed before the fixing of prices, Sept. 24, even where specifications have been given. Litigation is threatened by some of the mills.

The Iron Trade Review

EDITORIAL

Woman Problem Demands Study

EACH day brings war's grim realities a little closer to the American people. With this clearer realization comes also a clearer visualization of the problems connected with this vast military undertaking. It is because of this that employers are becoming more and more interested in the study of woman's capabilities in the field of labor. Undoubtedly her field is going to be enlarged to a great extent. What woman is doing in the field of industrial labor, what are the problems of her employment and how the latter have been handled successfully are told in a sympathetic as well as in a practical way in a comprehensive article appearing in this issue. The number of women employed in industry is going to be greater than ever before, without doubt. They are going to be urged into occupations hitherto closed to them.

It is at this point that the danger lies. When war broke out in England patriotic fervor blinded the eyes of the people. Women were permitted to enter any occupation so long as they proved capable of standing up to the work from day to day. After the first flush of enthusiasm wore off, new aspects of the case appeared. Some work was too heavy for women, other work required long hours of standing which resulted in physical breakdowns in many cases. In addition to the detrimental effect upon women themselves, the children suffered. Mothers, working long hours could not properly take care of their children.

This country in facing this problem has Great Britain's example as a starting point. It does not have to begin at the beginning as she did. Therefore the lessons of Great Britain's mistakes should be taken to heart. There are certain types of work which woman eminently is well fitted to do. These consist of work requiring dexterity, lightness of touch and speed. There are certain other types which are physically harmful to women, that is, work requiring continuous standing and heavy lifting. In addition to the woman herself, she must be considered also as a home maker and a mother. If woman is forced to shirk these duties because the work in the shop and factory takes too much of her time and strength, the nation will pay for it by an increase in crime and vagrancy.

Before we put our women to work at any given job let us consider the two—woman and the job—from all possible aspects. Since the health and morality of future generations is concerned, it is imperative that an earnest effort be made to so adjust the labor between men and women that the least possible harm will be done.

The Turn of a Long Lane

FRUITS of the popular game of swatting the railroads which has been played freely by state and federal authorities in the country in recent years are to be found in the story of railroad expansion in 1917 now to be read in the annual statistics. According to the *Railway Age*, a condition came about in the year whereby the trackage of the country practically was reduced instead of enlarged. Only 979 miles of new track were built in the year. Against this, 451 miles actually were torn up, 491 miles were abandoned, and on 396 miles, permission to abandon was asked of state authorities by the owners. This meant a virtual net loss of 359 miles in the active trackage. In 1916, the new construction totaled 1098 miles; in 1915, 933 miles, and in 1914, 1532 miles. The record of the past 12 years has shown an almost unbroken decline. In 1905, 4388 miles were built and in 1906, 5623 miles.

These figures effectively portray the loss of faith of investors in railroad securities. No matter how hard pressed the carriers have been for extensions, soundly justified by increased business, and present conditions show many lines have been in this class, they have been unable to enlist the necessary capital except at prohibitive rates. The inevitable result has been that properties have been allowed to depreciate and extensions have languished. The restoration of credit which will result from the control of their affairs by the national government means that the railroads are to have a fair chance to redeem themselves. More than that, it means the substitution of a superseding railroad sovereignty, federal, for as many diverse and conflicting local authorities as there have been forms of state control.

Dilution of Labor Advocated

SKILLED workmen continually are being withdrawn from the industries to build the huge national army now in the formative stage. Where is the steady stream of workers to come from so essential to the production of the nation's munition and other war essentials? This question, particularly pertinent at the present time, has been formally recognized by the assembling, in Boston a short time ago, of representatives of ordnance makers,

EDITORIAL

trade school representatives and the New England committee on industrial training for war emergency. The importance of the question is shown in the case of two New England manufacturers who must increase their forces of 14,000 by approximately 35 per cent before April 1.

Proficient workers, it was brought out, are difficult to secure and the conference advocated the speeding-up of the munition industry by teaching women to do the work of men. Insofar as accuracy, freedom from accident and excellence of work are concerned, women, it was contended, are superior to men if their tasks are subdivided and supervised by skilled male their own. Munition requirements will increase directly as the duration of the war, but it is thought that the gradual falling off of nonessential industries will release women from industrial pursuits who, with training, will quickly become efficient in their new tasks.

War Stimulates New Grinding Practice

THE European war has brought about marked improvements in American manufacturing methods, among them being the adoption of wide-faced grinding wheels as used on precision grinding machines. These wheels are the result of exhaustive experimentation on the part of grinding wheel manufacturers and they have given especially good results in finish grinding the outer surface of shrapnel and high-explosive shells. With the use of the wide-faced wheel, longitudinal feeding is entirely eliminated, the wheel being fed directly to the work by means of the cross feed.

With a wheel of the correct grit and grade several hundred pieces often can be ground without redressing. Wheels with 10-inch face have been used successfully on both straight and contour work. In the latter case the face of the wheel is trued to exactly the shape the operator desires to produce. The radius on a shrapnel case serves as a good illustration of this practice. From the comparatively thin, small-diameter grinding wheels of yesterday to wheels of 24-inch diameter with a 10-inch face is a distinct departure. The grinding wheel manufacturer has not brought about the change alone, however; the co-operation received from the grinding machine builder was, of course, of vital importance. Large grinding wheels require heavy grinding machines and the grinding machine builder has kept pace with the times by designing the massive and substantial machines that have made the use of the wide-faced wheel a commercial possibility. Thus the war has served a useful purpose in helping to perfect efficient manufacturing methods that will prove of value in the years to come.

A Propaganda Not Made in Germany

ARRESTS do not stop treason, nor do jail sentences obliterate the slimy trail of the strike promoter. With the strike menace the greatest which today confronts our war and allied industries, a positive aggressive propaganda should be directed toward teaching the lessons of Americanism.

In the mines and in the large centers where war industries are being driven to capacity, the foreign labor element predominates. That great class which under normal conditions might peacefully pass through the "melting pot", now over the fierce fires of war and with the added fuel of exorbitant wages to be obtained, frequently "breaks out" and strikes result.

All strikes are not fomented among foreigners, nor, unfortunately, are all strike promoters enemy aliens. But the simple credulity of the foreigner is most easily imposed upon by the arguments of cupidity which form the stock in trade of the professional strike maker. Moreover, aliens have not the restraining influence of patriotism which *should* prevent disastrous strikes in war lines. It is to supply this latter influence that a propaganda of Americanism should be directed.

Some steps in this direction have been taken. Bureaus of Americanization exist in most of the large cities, and the lessons of citizenship are being presented to all who will accept them through schools, newspapers and industrial organizations. These outside efforts do not entirely counteract the effect of such Bolshevik arguments as "the rich man's war", and "Wilson is England's catspaw". A more aggressive propaganda is needed, and it must originate within the ranks of labor.

A step in this direction was taken by the Ohio union miners in their convention at Columbus last week. They adopted an amendment to their constitution which excludes from membership any foreigner who, after the legal residence of three years has not made an effort to become a citizen of the United States. Citizenship through coercion will not solve the problem, but the moral effect of a united labor sentiment towards Americanism and a propaganda directed from within will accomplish much. A man hesitates to destroy the house in which he lives.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 244

PIG IRON

Bessemer, valley	$36.30
Bessemer, Pittsburgh	37.25
Basic, Pittsburgh	33.95
Basic, eastern Pa.	33.00
Basic, Buffalo	33.00
Malleable, Pittsburgh	34.45
Malleable, Chicago	33.50
Malleable, Philadelphia	34.00 to 37.50
Malleable, Buffalo	33.50

GOVERNMENT SCHEDULE

1.75 to 2.25 silicon (No. 2 foundry, No. 2 plain, and No. 3 southern) ..... $33 furnace base
2.25 to 2.75 silicon (No. 2X, No. 1 Northern foundry, and No. 2 southern) ..... base plus 50c
2.75 to 3.25 silicon (No. 1X No. 2 soft) ..... base plus $1.50
Over 3.25 silicon ..... $34.50, plus $1.00 for each ½ per cent of silicon.

No. 1X, Phila.	35.25 to 35.50
No. 2 foundry, Pittsburgh	33.95
No. 2 foundry, Cleveland	33.95
No. 2 foundry, Ironton	33.00
No. 1 foundry, Chicago	33.50
No. 2 foundry, Chicago	33.00
No. 2X foundry, Phila.	34.25 to 34.50
No. 2X foundry N. J. tide	34.25 to 34.50
No. 2X foundry, Buffalo	33.50
No. 2 plain, Philadelphia	33.75 to 34.00
No. 2 plain, N. J. tide	33.75 to 34.00
No. 2 southern Birmingham	33.00 to 33.50
No. 2 southern, Cincinnati	36.40
No. 2 southern, Chicago	37.50
No. 2 southern, Phila. del.	38.30 to 39.40
No. 2 southern, Cleveland	37.50
No. 2 southern, Boston	39.50
No. 2 southern, St. Louis	35.90
Virginia, No. 2X, furnace	33.50
Virginia, No. 2X, Phila.	36.77
Virginia, No. 2X, Jersey City	37.02
Virginia, No. 2X, Boston	37.27
Silveries, 8 per cent, furnace	46.00
Silveries, 8 per cent, Chicago	48.54
Low phos. standard, Phila.	55.00 to 56.00
Low phos., Lebanon furnace	50.00
Low Phos., Piittsburgh	53.00
Charcoal, Superior, Chicago	37.50
Charcoal, Superior, Buffalo	39.75
Charcoal, southern furnace	43.00

COKE

(At the ovens.)

Connellsville furnace	$6.00
Connellsville foundry	7.00
Wise county furnace	6.00
Pocahontas furnace	6.00
New River foundry	7.00
New River furnace	6.00
Wise county foundry	7.00

FERRO ALLOYS

Ferromanganese, delivered	$250.00
Spiegel, 20 per cent fur.	60.00
Ferrocarbon titanium, carloads, maker's plant	160.00
Ferrosilicon, 50 per cent, Pittsburgh,	175.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	160.00 to 170.00
Bessemer ferrosilicon, 9 per cent.	$54.00
Bessemer, ferrosilicon, 10 per cent.	55.00
Bessemer ferrosilicon, 11 per cent.	58.30
Bessemer ferrosilicon, 12 per cent.	61.60

Ferrosilicon prices at Ashland, Ky., Jackson and New Straisville, O.

SEMIFINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$47.50
Open hearth, Philadelphia	50.50
Open hearth, Youngstown	47.50
Bessemer, Pittsburgh	47.50
Bessemer, Youngstown	47.50
Forgin, Pittsburgh	60.00
Forging, Philadelphia	63.00

SHEET BARS

Open hearth, Pittsburgh	$51.00
Open hearth, Youngstown	51.00
Bessemer, Pittsburgh	51.00
Bessemer, Youngstown	51.00

WIRE RODS AND SKELP

Wire rods, Pittsburgh	$57.00
Grooved skelp, Pitts.	2.90c
Sheared skelp, Pitts.	3.25c

SHAPES, PLATES AND BARS

(In cents per pound)

Structural shapes, Pitts	3.00c
Structural shapes, Phila.	3.185c
Structural shapes, N. Y.	3.195c
Structural shapes, Chicago	3.00c
Tank plates, Chicago	3.25c
Tank plates, Pittsburgh	3.25c
Tank plates, Philadelphia	3.435c
Tank plates, New York	3.445c
Bars, soft steel, Pittsburgh	2.90c
Bars, soft steel, Chicago	2.90c
Bars, soft steel, New York	3.095c
Bars, soft steel Phila.	3.085c
Bar iron, Chicago	3.50c
Bar iron, Phila.	3.50c to 3.685c
Bar iron, Cleveland	3.64c to 3.70c
Bar iron, New York	3.695c
Bar iron, Pittsburgh	3.50c
Hard steel bars, Chicago	3.00c
Cotton ties, Pitts., Jan.	$2.18

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh base	3.25c
Angle bars, Chicago base	3.25c
Standard bessemer rails, mill	$38.00
Stand. open hearth rails, mill	40.00
Light rails, 25 to 45, mill	3.00c
Relaying rails, light, St. L.	75.00 to 80.00
Spikes, railroad, Pitts.	3.90c
Track bolts, Pittsburgh	4.90c
Track bolts, Chicago	4.90c
Tie Plates, Chicago	3.25c

WIRE PRODUCTS

(Per 100 lbs. to jobbers; retailers 5c more)

Wire nails, Pittsburgh	$3.50
Coated nails, Pittsburgh	3.45
Plain wire, Pittsburgh	3.25
Galvanized wire, Pittsburgh	3.95
Polished staples, Pittsburgh	3.65
Galvanized staples, Pittsburgh	4.35
Barb wire, painted, Pitts.	3.65
Barb wire, galvanized, Pitts.	4.35
Cut nails, Pittsburgh	4.00

CHAIN, PILING, STRIP STEEL

(In cents per pound)

Chain, ⅜ in proof coil, Pitts	8.00c
Sheet piling, base, Pitts.	4.00c to 5.00c

Cold rolled strip steel, hard coils, 1½ inches and wider by 0.100 inch and heavier, base per 100 pounds, 6.50c.

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SHEETS

In cents per pound)

SHEET MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c
No. 28, open hearth, Chi.	5.215c

TIN MILL BLACK

No. 28, open hearth, Pitts.	5.00c
No. 28, bessemer, Pitts.	5.00c

GALVANIZED

No. 28, open hearth, Pitts.	6.25c
No. 28, bessemer, Pitts.	6.25c
No. 28, open hearth, Chi.	6.465c

BLUE ANNEALED

No. 10, open hearth, Pitts.	4.25c
No. 10, bessemer, Pitts.	4.25c
No. 10, open hearth, Chic.	5.715c to 6.215c
No. 10, open hearth, Phila	4.435c

TIN PLATE

(Per 100 lb. box)

Tin plate, coke base, Pitts.	$7.75

IRON AND STEEL PIPE

Base Pittsburgh

Base Pittsburgh	Black Per cent off	Galv. Per cent off
¼ to 3 in., butt, steel	51	37½
¼ to 3 in., butt, iron	33	17

BOILER TUBES

Steel, 3½ to 4½ inches, l. c. l.	30
Iron, 3½ to 4½ inches, c. l.	12½

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	57.30
Six-inch and over, Chicago	54.30
Four-inch, New York	58.35
Six-inch and over, N. Y.	55.35
Four-inch, Birmingham	52.00
Six-in. and over, Birmingham	49.00

HOOPS, BANDS, SHAFTING

Class A pipe is $1 higher than Class B.

Hoops, Pittsburgh	3.50c
Bands, Pittsburgh	2.90c
Shafting, Pitts., carloads	17 off to list

RIVETS

Structural rivets, Pittsburgh	4.65c
Boiler rivets, Pittsburgh	4.75c
Rivets ⅞ in. and smaller, Pitts.	45 and10 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter)

Rolled thread	50–5 off
Cut thread	40–10–5 off
Larger and longer	40 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts)

Rolled thread	50–10–5 off
Cut thread	50–5 off
Larger and longer	40–10 off
Cold pressed semi-finished hexagon nuts ⅝ in. and larger	60–10–10 off
Cold pressed semi-finished hexagon nuts ⅞ in. and smaller	70–5 off
Gimlet and cone point lag screws	50–10 off

NUTS

Hot pressed, square blank	2.50c off
Hot pressed, square tapped	2.30c off
Hot pressed, hexagon blank	2.30c off
Hot pressed, hexagon tapped	2.10c off
Cold pressed, square blank	2.25c off
Cold pressed, square tapped	2.00c off
Cold pressed, hexagon blank	2.25c off
Cold pressed, hexagon tapped	2.00c off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products January 16, average for December 1917, average for October 1917, and average for January, 1917. Prices are those ruling in the largest percentage of sales at the dates named

	Prices Jan. 16, 1918.	Average prices Dec., 1917.	Oct., 1917.	Jan., 1917.
Bessemer pig iron, Pittsburgh..	$37.25	$37.25	$37.25	$35.95
Basic pig iron, Pittsburgh....	33.95	33.95	33.95	30.95
*No. 2 Foundry pig iron, Pitts.	33.95	33.95	33.95	31.95
*No. 2. Foundry pig iron, Chi.	33.00	33.00	33.00	30.00
Lake Superior charcoal, Chicago	37.50	37.50	48.50	33.75
Malleable, Chicago	33.50	33.50	33.35	30.00
**Southern, No. 2, Birmingham.	33.50	33.50	33.00	23.00
*Southern Ohio No. 2, Ironton	33.00	33.00	33.00	30.00
Basic, eastern Pa.....	33.00	33.00	33.00	30.50
**No. 2X Virginia, furnace....	33.50	33.50	33.50	26.50
**No. 2X foundry, Philadelphia	34.25	34.00	34.00	30.50
Ferro mang., delivered.....	250.00	247.50	302.00	175.00
Bessemer billets, Pittsburgh....	47.50	47.50	58.75	60.00
Bessemer sheet bars, Pittsburgh	51.00	51.00	65.50	60.00
Open hearth sheet bars, Pitts..	51.00	51.00	65.50	60.00
Open hearth billets, Pitts.....	47.50	47.50	58.75	60.00
Steel bars, Pittsburgh.....	2.90	2.90	2.90	2.975
Steel bars, Chicago.....	2.90	2.90	2.90	3.19
Iron bars, Philadelphia.....	3.685	3.685	4.935	3.159
Iron bars, Cleveland.....	3.64	3.64	4.50	3.00

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.

	Prices Jan. 16, 1918.	Average prices Dec., 1917.	Oct., 1917.	Jan., 1917.
Iron bars, Chicago mill.....	3.50	4.50	4.50	2.85
Beams, Chicago.....	3.00	3.00	3.00	3.19
Beams, Pittsburgh	3.00	3.00	3.00	3.075
Beams, Philadelphia	3.185	3.185	3.185	3.509
Tank plates, Pittsburgh	3.25	3.25	3.25	3.575
Tank plates, Chicago	3.25	3.25	3.25	3.89
Tank plates, Philadelphia ...	3.435	3.435	3.435	4.909
Sheets, blk., No. 28, Pitts....	5.00	5.00	7.75	4.56
Sheets, blue anld., No. 10, Pitts	4.25	4.25	7.875	4.125
Sheets, gal., No. 28, Pitts... ..	6.25	6.25	8.8125	6.56
Wire nails, Pittsburgh.....	3.50	3.50	3.875	3.00
Connellsville fur. coke.....	6.00	6.00	.....	7.25
Connellsville fdy. coke.....	7.00	7.00	.....	6.375
Heavy melting steel, Pitts.....	30.00	30.00	31.50	23.25
Heavy melting steel, eastern Pa.	30.00	28.75	26.10	21.50
Heavy melting steel, Chicago.	30.00	28.50	27.00	20.25
No. 1 wrought, eastern Pa....	35.00	35.00	40.80	26.50
No. 1 wrought, Chicago.....	35.00	31.50	36.25	25.35
Rerolling rails, Chicago.....	35.00	35.75	36.00	27.25
Car wheels, Chicago.....	30.00	29.50	31.00	21.85

(For Additional Prices See Page 244)

Loss of Iron Production is Heavy

Furnaces on All Sides Forced to Bank by Fuel Shortage and Weather Conditions Are Resuming Gradually—Propose to Pool Coke to Most Efficient Plants—Some Sellers Book for Last Half

Pittsburgh, Jan. 15.—Production of pig iron has been greatly affected by the severe weather and congested traffic conditions. The actual output of iron, however, appears to be on a higher average than it was one week ago. This is not due to any marked improvement in the receipt of fuel, or in the railroad situation, but rather is attributed to the fact that some furnaces which were banked remained idle, pending an accumulation of coke and have resumed operations. The supply of fuel being received is extremely limited and unless improvement in this direction is made within the next few days, more banking will be necessitated. The Carnegie Steel Co., which had 20 furnaces down one week ago, now has reduced this number to 16, eight of which are out of blast for relining and repairs. Embargoes are restricting shipments of iron, which are being insisted upon by some consumers, although most of them realize the position of furnace operators and are not pressing them unduly for delivery. The shortage of gas and oil also has interfered with production. Some melters are borrowing iron from stacks of steel works for which they are making mill equipment. J. Leonard Replogle, director of steel supplies of the war industries board, is giving consideration to a plan to pool coke shipments so that fuel may be distributed to furnaces throughout the country with a view to insuring the greatest iron production possible. Admittedly there are many phases of this question which are difficult of solution and some suggestions which have been made probably will be discarded as being impractical. The idea of giving preference to furnaces which require the least amount of coke to make a ton of pig iron and closing down temporarily old furnaces, some of which consume 3000 pounds of coke in the manufacture of a ton of iron, is one proposal under way. There is also a plan by which the average operations of all furnaces will be calculated and coke supplied to them accordingly. Such questions as the location of the furnaces, transportation conditions, the elimination of cross-hauls in the coke regions and the supplying of coke from regions nearest the furnaces enter into the question. Some steelmakers self-contained on their iron supplies have been forced to buy steel-making metal to meet shortages. One of these is the Youngstown Sheet & Tube Co. Otherwise the market is inactive.

Price Uncertainty is Factor

Boston, Jan. 14.—Business in pig iron continues largely at a standstill in this territory, though there is no lack of inquiry and undoubtedly a large tonnage could be moved over if the metal were available, or the furnaces were content to go ahead and accept contracts containing the government clause relative to prices. In a few isolated cases, some business has been accepted subject to price revision, but as a general rule, the furnaces are very much disinclined to take the chances that the clause involves. If it was certain that the present basis would be affirmed after March 31, there would be more doing in forward business; it is the uncertainty about what the price is going to be that makes the iron makers indifferent about business. Meanwhile

the furnaces almost without exception are sold up to July 1, and about the only iron available for current needs is the stock that does not come within the ordinary specifications. There is a strong demand for such lots of iron as come on the market, for between the labor troubles, scarcity of coke, with the attendant banking of furnaces and the congestion of freight, there are many New England melters who have contracted for iron that they are not able to get. It is these users who are looking for spot iron to tide them over until such time as the material owing them gets in. There is no doubt that to secure supplies, these foundries gladly would pay a premium. Between the lack of iron and the pinch in the supply of steam coal, the situation is serious for the foundries in this section of the country.

15,000 Tons of Basic Sold

Philadelphia, Jan. 14.—The only important sale of pig iron in this district during the past week was one of 15,000 tons of basic for first half. Numerous other transactions embraced lots of off-iron principally which ranged from 1000 tons downward and did not form a large total. Inquiries which came out call for large tonnages of basic, standard low phosphorus, foundry and bessemer and the deliveries wanted extend throughout 1918. It is almost the universal custom for furnaces not to quote on these, due to the extent to which they already are sold ahead, and to the government recommendation that all contracts calling for delivery beyond April 1 be made subject to revision in the government price. Owing to inability to secure standard grades, many consumers are scouring the market for off-iron and are taking almost anything that is offered. Some of the off-iron sold during the past week was on the basis of "when and if produced".

Sell Last Half Freely

Cleveland, Jan. 15.—Heavy sales, though limited to a few interests, have followed the preceding week's dullness in pig iron, when the government's new declaration on contract prices beyond April 1 had the effect of sharply checking new business. Certain producers have opened their books freely to their regular trade, especially that portion engaged on government orders for the last half of 1918, and have closed a liberal tonnage. All these contracts have included the clause making the price after April 1 subject to the government price in effect at the time of delivery. Basic and malleable have predominated. A northeastern Ohio steelmaker who sought 20,000 tons of basic for second quarter and 30,000 to 40,000 tons for last half has purchased heavily, especially for shipment beyond July 1. This interest, however, has not yet filled its requirements. A Massillon, O., consumer has revived an inquiry for 15,000 tons of basic for first half. It develops that the 36,000 tons of basic of navy work closed for an Erie plant, as reported a week ago, was placed direct by the consumer with valley makers and not by government agency. The various navy yards are in the market for 8000 tons of low phosphorus, charcoal and Nos. 1, 2 and 3 foundry for all of 1918 and this business is expected to go largely to eastern furnaces. Malleable plants have come into the market freely for last half, in single cases for 8000 and 10,000 tons. About 10,000 tons have been placed, with 30,000 tons remaining open. Last half foundry inquiry also has been heavier. Alabama and Tennessee makers sold about 3500 tons for third and fourth quarters in this district during the past week. Production gradually is working back after last week's sweeping curtailment, when few stacks in this and surrounding districts escaped banking or slowing up.

Many Get Price Booklet

ANNOUNCEMENT of the compilation by THE IRON TRADE REVIEW of the first complete collection of official base prices, differentials and extras fixed on iron and steel products under government supervision, has brought forth a heavy demand from all quarters of the industry, showing the urgent need for such a booklet. The method of grouping the various schedules according to general product, the handy size, general style, indexing, etc., all facilitating quick reference, have elicited many compliments. Such an extensive call for the booklet has developed that it has been found necessary to put a nominal charge of 50 cents each to cover the cost of publication, where one or several extra copies are wanted. All subscribers will continue to be entitled on application to a single copy without charge, as long as the edition lasts.

Shipments Are Upset

Cincinnati, Jan. 14.—The storm has played havoc with shipments. Foundry iron enroute from the south has been located at nearby points across the Ohio river, but delays in getting it to melters on this side seem almost interminable. Shipments to Chicago territory from both the south and Virginia furnaces also are indefinitely delayed, while southern Ohio furnaces are unable to make any promises as to when the iron can be loaded, or when it will get to destination. About the only item of interest outside of shipping difficulties experienced, is the reported sale of several lots of Ohio silvery iron for last half shipment. Only one furnace had any iron to offer and this now has been cleaned up. For prompt shipment high silicon iron cannot be obtained. Virginia iron is entirely out of this market and sellers have none to offer for even the last half. The banking of many furnaces in all districts is becoming a more serious matter, if late reports can be relied upon.

No Business is Done

St. Louis, Jan. 12.—During the past week the pig iron business at this point has been as near to a complete standstill as at any period in recent years. Virtually nothing was done, so far as could be learned, for future delivery, and scarcity of offerings and the blizzard put a sharp period to spot transactions. Representatives here of all the leading producers report they have nothing to dispose of. Their principals are sold up well into the future, and the recent recommendation of the war industries board that deliveries after April shall be subject to federal revision, has further accented inertia. Meanwhile, however, consumption in this district continues unabated. The more important mills are well provided for with contract material and until the end of this week, shipments have been coming along in fairly satisfactory shape, allowing the maintaining of a working reserve. Inquiries during the week aggregated between 5000 and 6000 tons, including 1200 tons of No. 2 southern by a leading stove manufacturer who has booked a government order. The fuel situation here is probably better than in any other important iron and steel center of the country.

Southern Market Strong

Birmingham, Ala., Jan. 15.—Southern pig iron manufacturers are selling as it suits their fancy. Inquiries are coming in from every direction and the market is strong. The make for the first half of year practically has been sold, except as to certain grades and some off-grade iron. Contracts now being made for delivery during

the last half of the year carry the stipulation that prices are subject to revision by a government agency after April 1. Production in this section shows no improvement and there appears to be no chance for any material improvement in the near future. Furnace stocks again are dropping and the prospects are that before long the probable make will have to be depended on entirely. No improvement is to be noted in the railroad situation, though the indications are there will be relief before long. Passenger train service is being curtailed and every attention possible is being given to the freight business. Sales of large quantities of basic iron by southern makers for delivery through the entire year are heard of, though details are not announced.

Revision Clause Retards

Buffalo, Jan. 14.—The government order specifying that there may be a revision of prices, March 31, is having a deadening effect on the pig iron market. Furnaces are loath to take on orders for a definite delivery at an indefinite price. Until March 31 draws nearer the revision clause is going to have a retarding effect on business in this district. One firm announces that it has temporarily retired from the market on this account. Other furnaces are faced by operating difficulties and are marking time awaiting improvement of the traffic situation. Furnaces which were banked some weeks ago remain banked and others are operating uncertainly from day to day. The position of one interest which manufactures its own coke from its own coal is fair, but that of another which makes its own coke, but from outside coal is worse. Two other interests which must arrange to purchase coke from outside face serious difficulties. One of these interests is running at half capacity and is behind on shipments. Customers are lenient on specifications, realizing the difficulties the furnace man is up against. Another furnace is sticking to its policy of remaining out of the market until it is able to deliver. Iron shipped by this plant in November has not yet reached its destination. An aggregate of about 500 to 600 tons of iron was sold during the week. The inquiry is good, with requests for 2000 and 3000-ton lots pending. Considerable inquiry is out from New England.

The Youngstown Sheet & Tube Co. has established a branch office at Cleveland, with G. G. Stewart in charge.

Coke Still Critical Point

Blizzard Conditions Set Back Moderate Improvement Which Had Been Started—Car Supply at 30 Per Cent—Consider Pooling Plans

Pittsburgh, Jan. 15.—Traffic conditions in the Connellsville coke region continue to be extremely serious. The slight improvement in the movement of coke during the middle part of last week was brought to an abrupt end by the cold weather and blizzard which followed and all but completely demoralized conditions. Many loaded cars are standing on the sidings in the coke regions and cannot be moved because of lack of motive power and shortage of crews. The car supply is also at a low ebb and is 30 per cent today and will be 30 per cent tomorrow. Great quantities of coke are being drawn and dumped on the ground and some operators in order to eliminate this practice as much as possible are keeping fuel in the ovens as long as 96 hours and are alternating operations, placing them on a 50 per cent basis. Blast furnace interests are striving eagerly to get supplies since the weather has moderated somewhat and are succeeding to a small extent. The movement is greatly restricted, however, and unless it is much freer than at present, many more furnaces will have to be banked. Some of them are operating on the strength of accumulated stocks which were gathered while the furnaces were idle. It is considered likely that the fuel administration, which is handling the coke situation, soon will take drastic action looking to a partial solution, at least, of the problem. A plan to pool coke, giving preference to furnaces which require the least amount of fuel per ton of iron has been put up for consideration to the fuel administration and J. Leonard Replogle, director of steel supplies. Another proposal is that the average requirements of all furnaces shall be calculated and coke supplied each in accordance with this. According to the *Connellsville Courier*, production for the week ending Jan. 5 was 216,098 tons, as compared with 351,398 tons the preceding week. Coke brokers anxiously are awaiting the decision of the fuel administration as to whether or not they will be allowed a commission for selling fuel. The administration some time ago held that no commission would be allowed over the government prices. It is felt that any commission must come from the operators. The latter, however, as a general thing, are opposing the payment of commissions and this undoubtedly has curtailed sales of coke.

Shortages Very Serious

Cincinnati, Jan. 14.—The fuel proposition has become so serious that the furnaces and foundries in all districts are very much alarmed. The curtailment in the production of pig iron, due to the shortage of furnace coke, is now reaching a point where furnaces are getting desperate. The recent blizzard, followed by an even worse period has tied up the transportation lines to such an extent that nothing can be relied upon to get through to destination. The foundries have limited fuel supplies.

St. Louis Feels Pinch

St. Louis, Jan. 14.—For the first time since the beginning of the present general coke shortage, certain plants in this district are feeling the pinch of scarcity. While all are well covered into the first half, railroad congestion, due to the blizzard, has cut seriously into deliveries. Even local deliveries by truck to outlying plants have been hampered. Dealers report an increasing demand and recent advices indicate the situation to the west and southwest is critical. Enormous pressure has been brought to bear to get tonnages through to barren spots in Oklahoma, Arizona, Texas and New Mexico and even Kansas City is sounding the distress signal, but all to little effect. Dealers declare it is impossible to obtain a single car of foundry coke from eastern ovens for immediate shipment and almost as hard to get a quotation for any future delivery. A little fuel continues to filter in from southern producers, but this is snapped up immediately. A leading dealer today said he easily could place 50,000 tons before sundown.

Furnace Demands Being Met

Birmingham, Ala., Jan. 15.—Practically the same conditions as to coal and coke as have existed here for the past few weeks are still in force. The output is larger than ever before, but the shortage is more acute. Furnace coke is plentiful if the delivery is maintained. The least lagging is felt by iron makers. Coke production is above normal. No new contracts are being accepted. All government schedules of price are being lived up to rigidly.

Scrap Inquiry is Heavier

Consumers Seek Large Tonnage Especially in East But Supplies Not Available—Dealers' Commissions Are Being Paid

FOR COMPLETE SCRAP PRICES SEE PAGE 244

Philadelphia, Jan. 14.—Demand for practically all grades of iron and steel scrap is much more active here. Many inquiries running into hundreds, and in some cases thousands, of tons, have been placed before the dealers during the past week and the consumers are willing to pay the full commission of 3½ per cent. Very little scrap has been bought or sold, however, due to difficulties which the original collectors are having in loading, as a result of the severe weather. Shipments also are very difficult as a result of the railroad congestion. The Pennsylvania railroad during the past week distributed a large tonnage of various grades, most of which went direct to consumers at the maximum prices. Forge fire and bundled sheet scrap advanced sharply during the week and now are bringing around $27.50, delivered eastern Pennsylvania. Dealers have construed the American Iron and Steel institute's recent revised announcement of prices as applying the $30 maximum to cast scrap only when the latter is sold as a substitute for heavy melting steel. When sold to foundries, higher is asked. Hence No. 1 cast scrap is selling at $33 to $34, delivered, to foundries in this district.

Rerolling Rails Decline

Boston, Jan. 14.—There is still a very firm market in practically everything in the way of scrap. Rather too many rerolling rails for current wants have appeared and the price has slumped about $3 to $4 from recent levels. Otherwise, prices either have held at the levels of a week ago, or have moved upward. Horseshoes have been advanced $1, cotton ties $2, stove plate 50 cents to $1, wrought iron pipe $3, railroad steel 50 cents, axle turnings $2 and machine shop turnings $1 to $2. The railroad situation still is unfavorable and while there are plenty of chances for business, the actual turnover is very much restricted by the fact that dealers find it next to impossible to get stock either in or out. Wholesale dealers' paying prices per gross ton f.o.b. shipping points follow: Wrought No. 1 yard long $29 to $30, horseshoes $29 to $30, cotton ties $22 to $23, stove plate $20 to $20.50, No. 1 machinery $33 to $33.50, No. 2 machinery $28 to $29, car axles, iron, $43 to $44, steel $43 to $44, rerolling rails $31, iron boiler plate $34 to $35, bundled barrel hoops $17.50 to $18, wrought iron pipe, new specifications, $27 to $28, steel rails $25 to $26, heavy melting steel $24 to $25, axle turnings $20 to $21, machine shop turnings $15 to $16, blast foundry turnings $14 to $14.50, cast borings $17 to $17.50, drop forge trimmings $21 to $22, cast iron car wheels, mill price, $30 to $32.

Sold on Commission Basis

Pittsburgh, Jan. 15.—Fair-sized tonnages of heavy melting steel, billet and bloom crops, No. 1 machinery cast and cast iron borings have been sold by dealers to consumers on a 3½ per cent commission basis. One sale involved 1000 tons of low phosphorus scrap. Users have shown no reluctance to pay this commission, being desirous of obtaining more scrap than can be supplied. The stocks of dealers either are low or entirely exhausted, and it is difficult and often impossible for them to obtain new supplies. When they are able to do so they are obliged to pay the government levels. This makes it necessary that dealers obtain a commission if they are to make any profit. The railroad situation has made it difficult to move scrap and additional embargoes, together with the increased trouble in obtaining permits, have formed a discouraging combination for the dealers. It now is necessary to obtain a permit from every road that handles old material, whereas up to recently it was necessary to obtain a permit only from the road that delivered the material to consumers. The market is firm and no sales under the prices set by the governmnt are known to have been made.

Demand Continues Strong

Buffalo, Jan. 15.—Scrap trading has been at a standstill during the week. There is plenty of demand, but the uncertainty of shipments is holding up the industry as it is holding up other developments. Few shipments have been delivered to consuming points and there is a decided shortage of scrap of all kinds. What little is being sold is bringing the maximum price under the government prices. All grades of scrap have been heavily inquired for, though the universality of the shipping situation has tended to curb this during the past few days. The stringency of the New York Central embargo on all points east was lifted somewhat during the week when the road offered to take shipments for Syracuse, but not east of that point, but storm conditions during the past few days have counteracted this development.

Busheling Has Jump

Cleveland, Jan. 15.—Short sales of No. 1 busheling have pushed the price up approximately $2, but outside of this the market is stagnant. Rail service is still only 15 to 20 per cent of normal, effectually putting a damper on shipments in and out. Dealers report no prospects of an appreciable betterment before spring, but once open weather comes to stay they expect prices to weaken and drop about $2 all around by midsummer. The American Iron and Steel institute's rulings on cast scrap and commissions which the American Board of Scrap Iron Dealers has put out have not aroused any favorable sentiment for government price-fixing. One dealer remarks that he believes he will get farther in the long run by minding his conscience and patriotism more than price schedules.

Chicago Market Inactive

Chicago, Jan. 15.—Unprecedented weather conditions preventing railroads from moving material is putting an effectual stop to scrap transactions. The market was slow before this happened, and with railroads unable to move material, consumers have no incentive to buy further. Most consumers are unable to operate their plants on account of lack of fuel, so they are not distressed by lack of scrap. On such items as a maximum price has been fixed by the government, commissions of 3½ per cent are being paid in most cases where quotations have reached the maximum. Current railroad lists do not offer much material, as would be expected under the conditions. The Northern Pacific offers 4400 tons, the Chicago & Eastern Illinois 500 tons, the Chicago, Milwaukee & St. Paul 950 tons, and the Chicago, St. Paul, Minneapolis & Omaha 610 tons.

Priority Orders Delayed

Cincinnati, Jan. 14.—All outside shipments are tied up and little business is being received from local melters, as even short hauls are almost impossible. Shipments made to the Pittsburgh district, on which priority orders were secured, are still enroute and have not much chance to reach destination this week. The

new prices have not yet been established, and until weather conditions permit of transactions being made, there is apt to be no change in the waiting attitude of local dealers.

Consumers Try to Buy

St. Louis, Jan. 12.—The market for iron and steel scrap continues quiet, with little business being consummated between mills and dealers direct. Owing to the fierce weather and railroad congestion, the tonnages of scrap in transit are hopelessly tied up and meiters are beginning to feel the strain. On the whole, however, the aspect of things from the dealer's viewpoint is a bit more hopeful than last week. Consumers are trying to buy for absolute needs at government prices or less. Dealers have such small stocks on hand that they are not pressing sales, being satisfied to dispose of tonnages on track which must be moved. Consumption is abnormally heavy, and reserves are vanishing rapidly. The recommendation of the American Steel and Iron institute in advancing all rolling mill grades to the maximum price of No. 1 railroad wrought is causing great anxiety to the rolling mill people, as under this ruling No. 1 busheling, yard wrought pipes and flues and other inferior grades now may be sold at the maximum price of $35 per gross ton. The maximum price of $47.50 per gross ton on shafting, locomotive tires, arch bars and transoms, couplers and knuckles, iron and steel axles, is less important as in this district these materials have recently been selling close to this maximum. Offerings of all sorts continue light.

Prices Not Defined

Birmingham, Ala., Jan. 15.—The position of scrap iron and steel dealers in the south is more uncertain and consumers continue to buy from hand to mouth. Dealers report the market in this territory is off. Embargoes in the east prevent shipment in any quantity in that direction. Quotations now given are not clearly defined by actual business. Supplies are better, but complaint still is being made of the transportation service. Further explanation of the rules as to charges for shearing material, under 18 inches, has been received.

Exemption from import duty on motor cars and trucks into Mexico has been extended to June 18, according to telegram received by the government from the American consul general at Mexico City. Modifications have also been made in the export duties on iron, steel and wire.

Diverge Over Shell Steel

Government Agrees to Modify Manganese Specification at Mills' Urging But Other Chemical Requirements Cause Further Differences

Youngstown, O., Jan. 16.—Representatives of the United States ordnance department, shellmakers and munition steel manufacturers who were in conference here last week relative to the government's steel specifications and method of rolling failed to reach an agreement. A further meeting will be held in Baltimore next week. Producers of shell steel are understood to have contended that in order to meet the manganese specification they have experienced an actual loss in steel output of about 20 per cent. The government officials agreed to adjust this loss by lowering the manganese specifications only. This caused further differences over the carbon, sulphur and silicon specifications. Ordnance department officials showed a disposition to do whatever might be possible to adjust the difficulties but would not sanction any change in specifications at that time. All of the 1,500,000 tons of shell steel for the government referred to by THE IRON TRADE REVIEW Oct. 18 and subsequently has been placed. The last shipment is expected to be made by June. The shell steel orders placed in this district have not been completed at the rate expected. The cause is laid to irregular transportation and the coal situation. At present one producer has between 4000 and 5000 tons of shell steel stocked in his mill yard on account of the existing railroad embargoes. As soon as these are nullified, this tonnage will go forward to the fabricators. This is only one of the many delays with which the mills have to contend.

Much Production Lost

Pittsburgh, Jan. 15.—Production of billets and sheet bars has been reduced greatly on account of the shortage of pig iron. While there continues to be a demand, many consumers have withdrawn from the market because they realize it is impossible to obtain material. It is estimated that the output of billets and sheet bars in the Pittsburgh district does not exceed 75 per cent of the capacity. Some makers are supplying bessemer steel to domestic consumers in order to conserve open-hearth tonnages for the government. The reduced output of sheet bars has had an adverse effect on the production of sheets, and it is probable that the output of sheets for the first half of 1918 will fall considerably below requirements. The market for wire rods is quiet. Limited demand for tonnages is coming to the mills, some of it from this government and foreign countries. Some makers are out of the market, making no offerings of either soft or carbon tonnages.

Strip Demand is Light

Pittsburgh, Jan. 15.—Domestic demand for cold rolled strip steel is light while requirements placed by the government involve fair sized tonnages. Producers show a disinclination to take contracts for deliveries after April 1, when prices are subject to revision. It is believed that the automobile trade soon will become a greater factor in the market inasmuch as it has succeeded in using up part of its accumulated shipments and new business taken by it will involve good sized requirements.

Quiet Start

Made by Warehouse Trade in New England in New Year

Boston, Jan. 14.—Jobbers in steel and iron products have not been crowded with business during the past week and since the first week of the year also was a quiet one, it cannot be said that the year is starting off very briskly. Supplies are not coming forward from the mills freely, but there is exceptionally little complaint on this score, probably because wants are not so great but that they can be filled from what is available and is being received. There seems to be a fairly good demand from outside points from plants working on government orders, but in the metropolitan district of Boston, where the demands are chiefly for building supplies, business is very light. Building requirements are estimated at present to be only about 20 per cent of normal. The accuracy of this estimate is hardly to be disputed in view of the scarcity and high cost of building materials, the scarcity and high cost also of labor and the fact that the banks are cautious in the matter of loans for building construction, except for essential undertakings. Warehouse prices hold unchanged on the government basis.

More Bars to Farm Trade

Implement Manufacturers Place Further Contracts for First Quarter—Different Contracting Policies Are Being Pursued by Mills

Pittsburgh, Jan. 15.—Implement makers have begun to make contracts rather freely for steel bars for first half delivery. Mills closing this business find themselves able to take care of the requirements of these consumers. They are supplying them with much bessemer tonnage where formerly open-hearth steel was specified. Bessemer steel, it is said, can be used as satisfactorily as open-hearth steel in much of the implement manufacture. Another practice of the mills is to furnish steel bars for this trade from shell discard steel which is found to be well suited for the production of such parts as plow beams and points. Contracts for steel bars are made at the regulated level of 2.90c, Pittsburgh, although prices are subject to revision on deliveries after April 1. This has unquestionably restrained buying and at the same time has made producers more cautious about taking new business.

Government Largest Buyer

Chicago, Jan. 15.—With the exception of tonnages placed by the government for various purposes, the finished steel market is unusually quiet, although consumers appear somewhat more inclined to place contracts now than during the closing weeks of last year. Government tonnages continue to be placed in fairly large volume and are spread over almost the entire range of products. One effect of the price-fixing program and the recent announcement that material delivered after March 31 will be at the new price to be fixed previous to that date is to make buying practically on a spot basis as there is no incentive to contract for distant deliveries. Some buying of bar iron is being done but it is not an active market and tonnages are largely for immediate delivery, with nothing beyond first quarter. Users of concrete bars are not covering but some manufacturers are taking hard bars for first quarter delivery. Producers of rerolling bars are not willing to book business for second quarter until the price of rerolling rails is made certain.

Selling Prices Vary

Cleveland, Jan. 15.—Divers selling policies continues to be pursued by leading producers. The leading interest and one of the largest independents are making no new contracts. The latter has cleared its books of such obligations and new business is altogether in the form of orders with specifications attached. Two independent mills are willing to make first quarter contracts, particularly in bessemer steel, but with the exception of a few implement makers who have been taken care of, consumers are not anxious to close. Extensions of contracts expiring Jan. 1 continue to be granted by one large producer as previously reported and in some cases these have been set back three months. War business is active and sellers have little to do outside of this. One inquiry from a local consumer for military purposes calls for 1000 tons of bars.

Shafting Buying Small

Pittsburgh, Jan. 5.—The market for cold rolled shafting continues quiet, producers reporting that new business involves only small tonnages. Requirements being taken by the government make up a considerable portion of the business. Traffic conditions have interfered with shipments but it is hoped that there will be marked improvement in this direction soon when it is expected more buying will develop, especially on the part of automobile makers.

Small Hoop Lots Placed

Pittsburgh, Jan. 15.—Makers of hoops report that they are taking new business for hoops but that tonnages involved are small. Some of the demand comes from this and allied governments. Domestic buying is of a miscellaneous character. The market for bands continues quiet. Producers are well caught up on contracts and are in a position to take new business and to make good deliveries.

Joins Steel Committee

A. F. Huston, president of the Lukens Steel Co., Coatesville, Pa., has been added as a member on the committee of steel and steel products of the American Iron and Steel institute which has had in charge the fixing of base prices, differentials and extras on various iron and steel products in behalf of the industry. The other members of the committee are as follows: Chairman, E. H. Gary, chairman, United States Steel Corp., 71 Broadway, New York; vice chairman, J. A. Farrell, president, United States Steel Corp., 71 Broadway, New York; secretary, E. A. S. Clarke, president, Lackawanna Steel Co., 2 Rector street, New York; J. A. Burden, president, Burden Iron Co., Troy, N. Y.; H. G. Dalton, Pickands, Mather & Co., Cleveland; A. C. Dinkey, president, Midvale Steel & Ordnance Co., Philadelphia; E. G. Grace, president, Bethlehem Steel Corp., Bethlehem, Pa.; W. L. King, vice president, Jones & Laughlin Steel Co., Pittsburgh; C. H. Schwab, chairman, Bethlehem Steel Corp., 111 Broadway, New York; J. A. Topping, chairman, Republic Iron & Steel Co., 17 Battery place, New York; assistant secretary, H. H. Cook, American Iron and Steel institute, 61 Broadway, New York.

Mills Down

In Tin Plate Industry Because Storage Capacity is Filled

Pittsburgh, Jan. 15.—Their storage capacity having become exhausted, the 30 tin-plate mills of the Farrell, Pa., works of the American Sheet & Tin Plate Co. have been forced to suspend operations. Other mills will close down for a similar reason, unless quick relief is provided in the way of supplying adequate transportation facilities for the movement of tin plate. Great quantities have been stored, and the output of this product will be reduced greatly if the transportation situation is not worked out. Shipments of fair-sized tonnages to the west are being made, but those to the east, the most important consuming section, are extremely limited. The food administration at Washington is endeavoring to secure priority shipments for tin plate and now has the matter up with the car service commission and hopes to obtain the necessary order so that normal operations of tin mills can be resumed and shipments made without interference.

Gas Division Buys

Youngstown, O., Jan. 16.—Only western shipments of tinplate are being made by the mills in this district, the embargoes having curtailed the eastern movement. Lack of storage has greatly hindered the production of mills since the embargoes went into effect and orders for thousands of boxes of tinplate have been deferred. Inquiring for domestic purposes is heavy although the mills have little to offer under two months' delivery. It is thought the government is about to place large orders

with the mills here. Recent inquiries were made as to what condition the mills were in to handle government specifications. A reply to this inquiry brought an order for 2500 base boxes for the flame and gas division. This will be shipped to a Philadelphia fabricator.

Brisk Demand

For Manufacturers' Wire is Shown—Production is Greatly Curtailed

Pittsburgh, Jan. 15.—Demand being made upon wire mills is fairly brisk, that for manufacturers' wire being the most active. Deliveries of this grade can be made within 30 to 60 days. The transportation situation, lack of fuel and scarcity of steel has sharply curtailed the output of wire mills, some of which have had to suspend operations temporarily. The government continues to place contracts for wire and wire nails, although as a general thing the tonnages involved are not as heavy as those which were being placed up to recently. There is also some export demand for wire which is being furnished to the entente allies. A consumer in the middle west has placed an order for 1000 tons of galvanized wire at the government figure of 3.95c, Pittsburgh.

Production Still Low

Cleveland, Jan. 15.—Wire production in this district which has been cut low by the recent traffic congestion and blizzard conditions, still is exceedingly small. Only a few of the cold rolling mills of the American Steel & Wire Co. are in operation and steel works and blast furnaces remain practically inactive. Little new business is coming out. Wire nails are not active, as the jobbers are quiet. Fevering demand from the jobbing trade has continued good. Small boltmakers continue to take tonnage freely.

Cement Record Broken

Portland cement production in 1917 broke the previous high record made in 1913. Approximately 93,554,000 barrels were manufactured, an excess of 1,500,000 barrels over the 1913 production and more than 2,000,000 over 1916's output. The high record for shipments, however, remains in 1916, since 1917 shipments of 90,630,000 barrels fell below 1916 by 3,922,296 barrels. Stocks at mills increased 33.7 per cent, as compared with 1916, the figures being 11,180,000 barrels for 1917 and 8,360,478 barrels for 1916.

Sheet Output is Curtailed

Operations Now Being Carried on at About 50 Per Cent of Capacity—Eastern Shipments Are Barred

Pittsburgh, Jan. 15.—On account of the inability to obtain sufficient supplies of sheet bars and because of the congestion of traffic, operations of sheet mills are greatly curtailed. It is estimated that the schedule of sheet mills does not exceed 50 per cent of their capacity. During the middle of last week the average operations of all the sheet mills was 53 per cent and this schedule has been reduced since. For a short period, prior to the holidays, government buying of sheets was not as brisk as it was during the latter part of the summer and the early part of the fall, but since the turn in the new year the tonnage placed by the government has been practically as heavy as any time since the United States entered the war. Large tonnages have been placed during the past few days by the government. It is believed that the railroad situation will be worked out more or less satisfactorily in the not distant future and will enable the mills to greatly increase production. Inquiry from domestic consumers is light but the automobile industry has become more interested and is making increased demand for deliveries. Most of the tonnage taken on contract at high prices, before levels were regulated by the government, have been shipped, although it is understood that a fair sized portion remains on the books of the leading interest at its regular contract prices for the second half of last year.

Eastern Deliveries Blocked

Youngstown, O., Jan. 16.—Difficulty is being experienced by sheetmakers in this territory in making shipments of finished material. The embargoes still are in effect with no prospect of immediate lifting. Shipments to all eastern points have stopped and sales managers are diverting this tonnage to western warehouses where stocks had become depleted. Sales managers are taking this opportunity to bring warehouse stocks up to normal although eastern consumers are being put further in arrears. Foreign shipments also are held up pending the lifting of the embargoes. One valley producer who rolled French and Italian tonnages of black and galvanized sheets during the first three days the embargo existed and stocked them on the mill shipping platform, had to dispose of the tonnage elsewhere in order that outgoing tonnage would not be blocked. Inquiry for small tonnages of all grades is plentiful and among the bookings of one producer was a 750-ton order for galvanized sheets from the Emergency Fleet corporation. The corporation also placed smaller tonnages with other valley mills. Several orders for black sheets ranging from 75 to 300 tons for immediate delivery, were accepted by another producer from consumers not in the embargoed zones. The orders will be substituted on the rolling schedule for those affected by embargoes. In case the embargoes are lifted before the rolling is completed, the orders either will be cancelled or deferred. One valley mill is rolling a fairly large tonnage of black sheets for a large steel company in the Pittsburgh district, the latter supplying the sheet bars. So far production of sheets in this territory has not been curtailed to any great extent by the unsteady sheet bar mill operations. Nearly all sheet mills not self-contained have an ample supply of bars. However, the blast furnaces of one self-contained producer have been working so irregularly, due to the coke situation, that pig iron had to be bought on the outside to avert a shut-down of his sheet mills.

Tool Steel Active

Cleveland, Jan. 15. — Government regulation of tool steel prices has had no noticeable effect as yet, due to the fact that sellers in this district could not be busier. Many orders are being placed for chrome valve steel for airplanes and one order was taken recently for 500 tons of nickel chrome steel, similar to the material manufactured at the Krupps factory in Germany. The Halcomb Steel Co. reports that December production was abnormal, many orders being taken for special shell steel. Inquiries continue to pour in from all over the country, the majority of which are for stock material. The chief difficulty in filling these has been the railroad congestion, but this is gradually loosening under Director General McAdoo's efforts. The high price level maintained for several months prevailed up until the time government regulation took effect.

Repudiate Shape Tonnage

Fabricators Refuse to Take Out Steel Placed Before Sept. 24 Even Where Specified—Suits Are Threatened

Philadelphia, Jan. 14.—Many fabricators both in the east and the middle west are repudiating shape contracts which they made prior to Sept. 24 at the high prices which prevailed up to that time. To such an extent is such action developing that the mills in some cases seriously are considering the institution of suits to recover for such breaches. Thousands and thousands of tons are involved and the fabricators in question are among the most important in the country. In some cases the latter say they cannot take the steel because their shops are full of government work. Some fabricators say flatly they will not accept the steel because they are able to place their requirements elsewhere at the government 3c price. One leading shape maker comments on the situation as follows: "We are not saying so much about the fabricators who did not specify on their contracts, but we feel particularly incensed against those who did so specify and now are going back on their obligations. The latter class includes companies whose specifications we have made up and now are held from shipping, and companies which held us up as we were about to start rolling their material. As long as prices were advancing these consumers took every pound we could ship them, and their refusal to take what they have specified now that the market is lower is distinctly a breach of business faith. That there is no excuse for their attitude is proved by the fact that the specifications in most cases call for stock lengths rather than steel for any particular jobs. As opposed to the policy of these fabricators, we are holding all our contracts for raw materials as inviolable no matter what the price we agreed to pay."

Many structural shape mills, it develops, are being devoted to the rolling of shell rounds, since bar mill capacity is insufficient to fill the shell steel allotments of these makers. One large maker has provided his two shape mills with rolls for shell rounds and temporarily is producing practically no shapes. Numerous inquiries for shapes are coming from abroad. Several small tonnages for South America were sold during the past week at 3.50c, Pittsburgh, and higer and on an inquiry from Canada 4.50c was quoted. On some small lots of ship shapes 5c to 6c was quoted. Plain shapes continue to be offered by one mill for delivery in four to six weeks at 3c, Pittsburgh, but demand is limited.

Building Business Dead

Chicago, Jan. 15.—In the absence of building operations, which have been becoming less through recent months, demand for structural shapes is now practically at a minimum. Not an important tonnage was placed in the west during the past 10 days and practically nothing is pending. The government continues to place tonnages of shapes, plates and bars for shipbuilding purposes, which is giving fabricating shops some business.

CONTRACTS AWARDED

Girder bridges for the Pennsylvania railroad, 300 tons, to the McClintic-Marshall Co.

Boiler house for the American Smelting & Refining Co., Perth Amboy, N. J., 225 tons to independent.

Bridge for Virginian railroad, 300 tons, to the American Bridge Co.

New buildings for the Defiance Machine Works, Defiance, O., 500 tons, contract deferred.

CONTRACTS PENDING

Bridges for the Southern railway, 500 tons, to be built by the company.

East river pier, New York, 425 tons, I. Stander & Co., general contractors.

Loading pier, Perth Amboy, N. J., 500 tons, T. A. Gillespie & Co., taking bids.

Large Order

For Wrought Pipe Distributed at Pittsburgh—Foundries Need Business

Pittsburgh, Jan. 15.—The Philadelphia Co. has distributed approximately 13,000 tons of the 30,000 tons of iron and steel lap-weld pipe recently inquired for. Of the awards made, 7865 tons were for steel and 5017 tons for iron pipe. The remaining tonnages soon will be placed. The Mark Mfg. Co. received approximately 5465 tons of steel sizes, including 2125 tons of 6⅝-inch pipe, 1750 tons of 10-inch casing and 1590 tons of 4-inch pipe. The remaining steel tonnage, 2400 tons of 8-inch casing, went to the Wheeling Steel & Iron Co. The Reading Iron Co., Reading, Pa., was awarded approximately 3849 tons of iron sizes, including 425 tons of 5 3/16-inch casing; 2762 tons of 6⅝-inch casing, 212 tons of 3-inch tubing and 450 tons of 2-inch tubing. The A. M. Byers Co. received about 1168 tons of iron goods, including 212 tons of 3-inch tubing, 506 tons of 2-inch tubing, 150 tons of 2-inch pipe, 250 tons of 1½-inch pipe and 50 tons of merchant pipe. Fair demand for lap-weld steel and iron pipe is current, chiefly from oil country interests.

Market Continues Dull

Chicago, Jan. 15.—Practically nothing is being asked of cast-iron pipe makers and western cities have not yet begun to inquire for their 1918 requirements. One tonnage is pending at Bay City, Mich., and an inquiry for a considerable tonnage for use in California is expected to appear shortly.

Southern Market Dull

Birmingham, Ala., Jan. 15.—Cast iron pipe manufacturers in the south report business quiet and unless more orders are received soon, there probably will be some curtailment of operations. The melt is still quite large, but with the exception of a few specifications of a moderate total, there is not much new business in sight. Some orders have been filled for Cuba and inquiries are in hand from South America, but nothing in the way of export business has developed of late. Soil pipe plants are idle, with no business of any consequence in sight.

Little Ferro Sold

Pittsburgh, Jan. 15.—Small tonnages of ferromanganese for prompt shipment have been sold the past week at $250, delivered. Limited lots of 20 per cent spiegeleisen for nearby shipment have also been sold, most of the tonnage going at $60, furnace. Consumers of 50 per cent ferrosilicon appear to be well covered, some of them for the entire year, and the market for this alloy is quiet. It is now quoted at from $175 to $180, delivered, for prompt shipment. Some tonnages, however, involving extremely limited lots, have been sold at higher levels. Makers of the lower grades of bessemer ferrosilicon are well committed on contracts and are making no offerings.

Awards Big Gun Order

The contract for between 15,000 and 20,000 Browning guns awarded by the United States government to the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been sublet to its subsidiary, the New England

Westinghouse Co. The weapons will be made in its Massachusetts plants. The limit set for the number of guns is said to be merely nominal, and their manufacture will continue until the American army is fully supplied with these weapons. The company is authorized by the war department to continue on a small scale the manufacture of the Russian rifles, the half-filled contract for which the British government recently terminated, in order to insure the integrity of the plant, pending the readjustment necessary to taking up the new line. The manufacture of machine guns will be confined to the East Springfield and Chicopee, Mass., plants. Another plant in Chicopee will return to the manufacture of sporting rifles. This announcement sets at rest the report that the plants were likely to be taken over by the government.

Active Demand

For Light Rails Develops—Small Spikes are Wanted

Chicago, Jan. 15.—Light steel rails are in considerable demand with deliveries possible in about four to six months. The South Chicago mill is inactive on account of storm conditions, but some rails are being produced at the Milwaukee plant. The former plant is shut down on account of lack of power, resulting from fuel conditions. Some inquiry for 1919 delivery is being received for standard steel rails, mostly in small lots, but this business is not being booked. Frog and switch manufacturers are taking some small lots of heavy rails on which they can obtain deliveries through 1918.

Spike Shipments Urged

Pittsburgh, Jan. 15.—Producers of small spikes are being pressed for shipments on contracts but are from 30 to 60 days behind on deliveries and find it impossible to ship to many points on account of embargoes. Jobbers have been placing fair sized contracts for small spikes, the demand having increased somewhat since the American Iron and Steel institute established prices fixing one basis, 3.90c, Pittsburgh, and providing an extra of $1 per 100 pounds on lots of less than 200 kegs. The market for standard spikes is extremely quiet. Small tonnages of light rails are being bought but the market for standard rails is dull.

The Charles A. Strelinger Co., 43-51 East Larned street, Detroit, will hereafter serve as Michigan district sales agents for the Gisholt Machine Co.

Revoke Some Plate Orders

Eastern Fabricators to Some Extent Follow Same Tactics as in Shapes —Mill Output Forced Much Below Normal

Philadelphia, Jan. 14.—Further good-sized tonnages of plates for fabricated ship steel were distributed by the Emergency Fleet corporation during the past week. With this exception business accepted during the past week was of very slender proportions. Fabricators who are repudiating shape contracts placed prior to Sept. 24, also to some extent are repudiating plate contracts booked at the high price prevailing before that date. In some cases the fabricators involved are refusing to accept plates, cut to their specifications, setting forth either that they are fully occupied on government work, or that they can get plates elsewhere at the government price. Plate output here continues to suffer from scarcity of coal. The Lukens Steel Co., for instance, could produce fully 1200 tons more per week than at present if it had sufficient coal. The output of the Worth Bros. Co. plant of the Midvale Steel & Ordnance Co., and of the Alan Wood Iron & Steel Co. also is much below normal for the same reason.

Little Open Tonnage Left

Buffalo, Jan. 14.—An inquiry is before the market for 1000 tons of tank plates for war purposes and 10,000 tons of bars and plates in connection with the government car-building program. On account of the fact that the government program calls for a much larger tonnage of plates than was first figured on, there will be less tonnage of the product available for commercial uses during the first half of 1918 than was anticipated.

Engineers to Meet

Iron and Steel Electrical Problems Form Topics

A joint meeting of the Pittsburgh section of the Association of Iron and Steel Electrical Engineers and the American Institute of Electrical Engineers will be held at the Hotel Chatam (old Hotel Lincoln), Penn avenue, Pittsburgh, on Saturday, Jan. 19. A paper will be presented on the "Generation, Distribution and Consumption of Power", by B. W. Gibson and B. A. Cornwel, of the Ohio works of the Carnegie Steel Co., Youngstown, O., for the Association of Iron and Steel Electrical Engineers. "Methods of Power Factor Correction" will be discussed by R. A. McCarty, power engineer, Westinghouse Electric & Mfg. Co., on behalf of the American Institute of Electrical Engineers.

The Philadelphia section of the Association of Iron and Steel Electrical Engineers will hold its next regular meeting on Feb. 2 when the subject of "Mill Type Transformers" will be discussed by H. G. Steele, of the Pittsburgh Transformer Co., Pittsburgh. The Cleveland district section of the association will hold its next meeting on Jan. 26, the subject to be announced later. The Pittsburgh section will hold a meeting on Feb. 16 at the Hotel Chatam when a paper on "Alternating Current and Direct Current Skip Hoists" will be read by Mr. Lindquist of the Otis Elevator Co.

More Ore

Available for Use in Furnaces Tributary to Lake Superior

Cleveland, Jan. 15.—The reserve supply of Lake Superior iron ore now available in furnace yards or on lower lake docks, is greater than at this time last year, despite decreased shipments on the lakes last year. An analysis of the blast furnace production record for 1917 shows that stacks running on Lake Superior ore consumed about 1,500,000 tons less ore than in 1916. Actual consumption was slightly less than 59,000,000 tons of ore. Heavier shipments were made to eastern stacks, but the 1917 total shipments of 62,500,000 tons were sufficient to build up the reserve supply by more than 2,000,000 tons.

The total shipments of iron ore from Lake Erie docks to furnaces between the opening and close of the 1917 season were 43,258,742 tons against 44,982,917 tons in the 1916 season. The 1916-17 winter shipments were 5,395,528 tons, giving a total movement in the year ended Dec. 1, 1917, of 48,654,270 tons against 50,549,863 tons in the previous 12 months.

Lake Erie docks at the close of the season held 10,326,349 tons against 10,167,760 tons on Dec. 1, 1916.

The ore trade is awaiting further action by the government in determining 1918 ore prices. Until a definite decision is announced, probably late in March, few contracts are expected to be made. Many consumers are placing reservations at this time.

War Board Reorganization Looms

Resignation of Chairman Willard of Industries Board and the Urgent Need of More Centralized Authority Believed Hastens Decisive Action—Retiring Chairman Says Output of Steel Will Not Be Adequate

WASHINGTON, Jan. 16.—Reorganization of the war industries board to centralize greater authority over the providing of essential war supplies, which has been pending for some days or the creation of a special bureau of munitions with a head responsible to the President apparently has been brought nearer by the resignation of Daniel S. Willard as chairman of the war board. Mr. Willard in explanation of his action, says he wishes to give his uninterrupted attention to the railroad problems. It is intimated, however, that the real cause was his unwillingness to act as a mere figurehead without authority.

The resignation was tendered to the President last night. It followed quickly Mr. Willard's appearance before the senate committee on military affairs where he as well as Barnard Baruch, chairman of the committee on metal supplies, declared in favor of the naming of one man responsible to the President to run the war industries board. This individual probably would be known as director of war industries with an organization similar to the food and fuel administrations. Neither favors the inauguration of a ministry of munitions or volunteer service but thinks that experts serving under such a director should be paid. A new cabinet office is not the thought of either, although both favor centralized authority as outlined.

Mr. Willard testified that the present board has no vested purchasing powers and is only voluntary. He said that the committees including the one on division of steel supply really have no authority. In reply to a question he said he thought J. Leonard Replogle, steel director, still is connected with the Wharton Steel Co., but that the latter had nothing to do with price agreements and only placed orders where they best could be filled.

Thinks Steel Output Inadequate

One of the striking points made in his testimony was that he thought the steel output will be inadequate to meet war requirements. He seemed reticent to give Rear Admiral McGowan much credit for navy's buying. He stated that the admiral's latest move to obtain competitive bidding might help the navy much more than the purchasing system that has been followed. He anticipated that the demand for war supplies will grow and recommended that surplus stocks should be laid by in reserve.

Mr. Willard said that section No. 3 of the food bill was responsible for the wrecking of the committee system of the war board and that if a director of industries is appointed, his committees should be approved by the President. In resigning, Mr. Willard recommended that John D. Ryan, president of the Anaconda Copper Co., who is at present engaged in important Red Cross work, be appointed his successor.

Affects Large Producers

Washington, Jan. 15.—The ammonia committee has sent out word that the ammonia and ammonia products covered by its proclamation requiring licenses for distribution are those produced in by-product coke plants, coal gas plants and nitrogen fixation plants only. As the administration says, "This excludes druggists, wholesalers and dealers handling only secondary products, and it excludes persons using the prime products solely as ingredients in the manufacture of products not subject to license."

Urge Kaiser's Ousting

Washington, Jan. 15.—How far business men and manufacturers of America will go in endorsing a plan promulgated yesterday by the chamber of commerce of the United States to influence German commercial interests to rid themselves of the kaiser and his government likely will depend largely upon independent interpretation of No. 3 of the 14 war aims the President stated last week, which is responsible for the chamber's move. The aim in question declares for "the removal, so far as possible, of all economic barriers and the establishment of an equality of trade conditions among all the nations consenting to the peace and associating themselves for its maintenance".

Appeal has been made by the chamber to have 500,000 American business men vote on a resolution which calls upon German tradesmen to establish a responsible government if they would continue to do business with America. In view of the interpretation by some of No. 3 of the aims as a declaration for free trade after the war, business men and manufacturers, even though the appeal may be made on patriotic grounds, may decline to subscribe to the chamber's resolution.

Regulate Coal Supply to Non-War Industries

Washington, Jan. 15.—Inauguration by the fuel administration last week of a "coal budget plan" by which it expects to save 50,000,000 tons of coal in industries not engaged in producing war materials was followed immediately by an order expected to conserve at least 780,000 tons of the total. The order was to manufacturers of boxboard, paperboard, strawboard, binderboard, tagboard and other kinds of board made from waste paper and rags. It prohibits use of fuel of any sort from 7 a. m., Saturdays, to 7 a. m., Mondays, under penalties provided in the Lever bill.

The fuel administration is negotiating with 100 so-called nonessential industries and among those which have been in actual conference with officials and which are likely to be among the next curtailed are the brewery, glassware, artificial ice, paint and varnish, confectionary and wall paper trades. The brewing industry has agreed to curtail production for a saving of 700,000 tons of coal but no official order has yet been issued. The boxboard order was made after a similar voluntary agreement, the administration announced.

The "coal budget plan" is to keep the nonwar industries going as much as possible to furnish employment for as many of the 10,000,000 persons engaged as can be consistent with the curtailment and to utilize as far as justifiable the $13,000,000,000 invested in the various lines of business. The budget is to give an estimate of the total 1918 production of coal, the coal needed for actual war essentials, the amount left for nonwar work, the coal used by nonwar essentials in 1917 and the total to be curtailed

from nonwar industries during 1918.

It is planned to save coal through reduction of hours, reduction of lines manufactured, elimination of new lines or designs, more efficient management and transfer of product from nonwar to war. Voluntary agreements of each industry to limit its own use of coal are to be followed by formal orders of the administration to make the agreements legal and binding.

Worst Tie-Up

In History of Chicago Industry Experienced—Many Stacks Banked

Chicago, Jan. 15.—Two heavy snow falls within a week, the later accompanied by unusually high wind and below-zero temperature, caused the annulment of all train service on railroads entering Chicago from Friday night until Monday. The result of this was to cause all steelmaking plants to shut down Friday night. Operations cannot be resumed before tonight, and in many cases probably not until the end of the week. Workmen in various plants were loaned to railroads to help in digging out and other large crews were used in clearing tracks inside plant yards and getting snow away from roadways and switches. No such complete tie-up of transportation has been seen since steel manufacture has been an important industry in the Chicago district.

The important item has been fuel, which is entirely cut off by inability of railroads to move cars. In addition to this, blockades inside plant yards have prevented free movement of material from one point to another, adding to the situation.

The Illinois Steel Co. has 15 stacks banked in addition to the five which have been blown out on account of fuel shortage. This leaves only eight furnaces active and they are being run at a slow rate. The Milwaukee plant, which has one stack active and one blown out, is operating its rolling mill, but South Chicago, Gary and Joliet plants are entirely idle. The plant at Duluth is operating 100 per cent, as it is independent of outside coal supply.

The Inland Steel Co. at Indiana Harbor, was forced to cease activities Friday and does not expect to resume work before Tuesday night and possibly later. The three stacks at this plant have been banked. The bar mill of the Republic Iron & Steel Co. at East Chicago, Ind., is idle and most of its workers are assisting railroads in digging out. The same condition confronts almost all plants in this industrial district and it will be several days under present conditions before activity will be resumed in anything like the normal volume.

Valley Conditions Bad

Youngstown, O., Jan. 16.—Operating conditions in the Mahoning valley show little improvement over last week. Both coking and steam coal shipments are very irregular. The Carnegie Steel Co. has three of seven blast furnaces in blast; the Youngstown Sheet & Tube Co. have two furnaces banked while the remaining stacks are at times on slack blast; one of the Hazelton furnaces of the Republic Iron & Steel Co. which was banked last week has resumed. The Brown-Bonnell finishing mills of the latter company are in operation although the officials look for another suspension at any time.

Even War Orders Suffer

Pittsburgh, Jan. 16.—Existing railroad embargoes are not a respecter of even government orders of iron and steel products. At Pittsburgh shipments of large tonnages of plates consigned to government plants have been blocked. In the Mahoning valley thousands of tons of government material, including sheets, tin plate, pipe and shell steel are sidetracked. One producer has several thousand tons of shell steel alone stocked in his yard. For the past month the government officials have been acquainted by steel officials with the way railroads in the Youngstown territory have been handling war shipments. Plenty of promises have been forthcoming, but nothing has been done to forestall the tie-up that now exists in these vital necessities.

Rerolled Bar Makers Put Out Full Extra List

Makers of steel bars, angles and miscellaneous shapes rolled from standard rolls have issued schedules of extras conforming with recent announcements in this product made by the general committee of the American Iron and Steel institute. These extras apply to the base price of 3c per pound mill. Heretofore the makers of rail steel bars have not charged extras for size or twisting. The complete list of extras per 100 pounds is as follows:

Rounds, squares and flats, including deformed bars and twisted squares. Base plus regular steel bar extras.

ANGLES

	Base
1 x 1-inch and larger x ⅛-inch and heavier	10c
¾ x ¾-inch x ⅛-inch and heavier	10c
1 x ⅝-inch x ⅛-inch and heavier	15c
Scant of ⅛ to 7/64-inch	30c

The extra for angles scant of ⅛-inch is additional to the extra for size.

MISCELLANEOUS SECTIONS

Channeled flats and cultivator reams	Base
U bars, regular channels, harrow I bars, diamonds and triangulars	10c

TEES

1½ x 1½ x 3/16-inch and larger	10c
1½ x 1½ x ⅛-inch and larger	30c
1 x 1 x ⅛-inch to 1¼ x 1¼ x ⅛-inch	20c
1 x 1 x ⅛-inch to 1¼ x 1¼ x ⅛-inch	40c

LESS THAN CARLOAD ORDERS

For less than carload lots, a minimum advance of 25 cents or a higher differential may be charged if local conditions justify.

QUANTITY DIFFERENTIALS

Quantities of less than 2000 pounds of a size, but more than 1000 pounds, 10c per 100 pounds.

Quantities of less than 1000 pounds of a size, 30c per 100 pounds.

CUTTING TO A LENGTH

For lengths 24 inches and longer no extra charge.

For lengths shorter than 24 inches extra subject to negotiations.

SPECIAL SECTIONS

Subject to negotiations.

Rapid Progress

Being Made on New Mills and Shipyard of Tennessee Company

Birmingham, Ala., Jan. 15.—Rapid progress is being made by the Tennessee Coal, Iron & Railroad Co., in the building of additional blooming, plate, shape and bar capacity at Fairfield, Ala., and by the Chickasaw Shipbuilding Co., subsidiary of the Tennessee company, on the new shipbuilding plant at Mobile on the Chicksabogue river. Large forces of men are woiking on the two plants and it is expected operations may be inaugurated by early fall. George Gordon Crawford, president of the two companies, during the past week made a personal inspection of both projects. An extensive tract of land embracing 13,500 acres has been acquired in Mobile so that sufficient ground is available for future development on a large scale. The building of the new shipyard is under the management of J. S. Coleman, an engineer of New Orleans, who has been made general superintendent of the plant. Ten ways are being installed and corresponding shop equipment is being provided. The plant will fabricate steel rolled at Fairfield. Two villages are being established, one for the white employes and the other for the colored. A large number of houses will be built. The villages will be thoroughly modern and sanitary and in accord with the latest ideas in community development.

While at Mobile President Crawford was a guest of honor at the annual dinner of the Mobile Chamber of Commerce.

Traffic Position

Of Steel Industry to be Reported Regularly—Mill Operations Low

New York, Jan. 16. (By wire.)—A committee of traffic managers of various steel companies has been appointed to advise A. H. Smith on traffic conditions in the steel industry, as suggested by the former to President J. A. Farrell of the Steel corporation.

The Steel corporation plants now are operating about 50 per cent of capacity at Pittsburgh and at 30 per cent at Chicago.

Moderate lots of rails have been made at $55, mill, for bessemer, and at $57 for open hearth. These prices to some extent indicate the current market. Good rail inquiries are current from Canadian roads.

Extension of contracts to various consumers being made by large steel producers is not general. Instead of booking new contracts, old ones are in some cases being held open for further specifications.

Huge Sum

Saved Government on Iron and Steel Products, Says Gifford

Washington, June 16.—Director Walter Gifford of the council of national defense also declared before the senate committee on military affairs for one-man control, though not necessarily through a cabinet officer. In summing up work of council and war board, he said adjustments of prices had saved for the government as follows: Iron and steel, $3,112,000,000, divided into pig iron, $1,640,000,000; shapes, $180,000,000; bars, $312,000,000; coke, $380,000,000; other steel products, $600,000,000. Copper savings reached $8,000,000; lead, $1,675,000; cement, $200,000; ship lumber, $2,800,000; cantonment lumber, $8,000,000; aircraft spruce, $2,850,000; shoes, $4,000,000; duck, $1,250,000, and alcohol, $2,250,000.

Cleveland Activity Low

Cleveland, Jan. 16.—Operating conditions in the Cleveland district show little improvement. Shipments of coal are far from being adequate and as a result many concerns have suspended operations. The company most affected is the American Steel & Wire Co. Only two of four blast furnaces at the Central works are blowing. The iron is being sent to the pig machine on account of the steel mills at Newburg having suspended. One cold roll strip mill at the Newburg plant and one at the Cuyahoga plant were the only units operating today.

Taking Many Bolts

Pittsburgh, Jan. 16. (By wire.)—The government has distributed all or a part of the 40,000,000 bolts for the Jeffersonville, Ind., arsenal, none of which went to Pittsburgh district makers. The government also has out an inquiry for 30,000,000 to 40,000,000 additional bolts.

Steel Orders Show First Gain in Months

Reflecting the first gain since last April, the report of the United States Steel Corp. as of Dec. 31 placed unfilled bookings at 9,381,718 tons. This is an increase of 5.44 per cent, or 484,612 tons over the amount reported for Nov. 30. Although freight congestion and hardships accompanying severe weather were big factors in cutting down shipments, it is thought that the growth of quietly placed government business undoubtedly contributed greatly to the gain shown in the Steel corporation's latest report. A comparative statement follows:

Date.	Total.	Change, tonnage.	Change, per cent.
Dec. 31, 1917..	9,381,718	484,612+	5.44+
Nov. 30, 1917..	8,897,106	112,569—	1.24—
Oct. 31, 1917..	9,009,675	823,802—	8.37—
Sep. 30, 1917..	9,833,477	573,572—	5.51—
Aug. 31, 1917..	10,407,049	433,115—	4.16—
July 31, 1917..	10,844,164	539,123—	4.74—
June 30, 1917..	11,383,287	503,304—	4.24—
May 31, 1917..	11,886,591	296,492—	2.43—
Apr. 30, 1917..	12,183,083	471,439+	4.02+
Mar. 31, 1917..	11,711,644	134,947+	1.16+
Feb. 28, 1917..	11,576,697	102,643+	0.90+
Jan. 31, 1917..	11,474,054	73,232—	0.64—
Dec. 31, 1916..	11,547,286	488,744+	4.43+
Nov. 30, 1916..	11,058,542	1,043,282+	10.41+
Oct. 31, 1916..	10,015,260	492,676+	5.18+
Sep. 30, 1916..	9,522,584	137,133—	1.42—
Aug. 31, 1916..	9,660,357	66,765+	.69+
July 31, 1916..	9,593,592	46,866—	0.48—
June 30, 1916..	9,640,458	297,340—	3.09—
May 31, 1916..	9,937,798	108,247+	1.11+
Apr. 30, 1916..	9,829,551	498,550+	5.34+

The Non-Ferrous Metals

Copper Lead Spelter Tin

New York, Jan. 15.—Copper again moved into the limelight in the metal markets last week, with reports from Washington that the war industries board had officially sanctioned the continuance of the present price of 23.50c for carloads until the close of the first quarter of 1918. These reports were branded as incorrect by the council of national defense, however, which stated that the matter had not yet been taken up directly. An announcement is expected in the trade this week. The 23.50c price has proved of general satisfaction both to producers and consumers in recent months. Copper producers at a meeting in New York a few days ago arrived at the conclusion that revision in either direction would be inadvisable at this time. It is thought, however, that the new agreement will contain the stipulation, as was the case in the steel agreement, that contracts booked for shipment on or after April 1 must be adjusted to meet any new price schedule determined. This stipulation is considered, in some quarters, a preliminary to government pooling of production and distribution of copper. It undoubtedly would have the effect of curtailing transactions to immediate requirements of consumers.

The tin market has remained barren of supplies the past week, with demand growing steadily more insistent. Americans own fully 3000 tons of tin in England, out of total stocks of less than 4000 tons there, while the British government is not permitting exports. In the future American importers and large consumers are expected to buy their supplies in Singapore, and some large buying has been done in that market. But it takes about three months to deliver from the far east and so little relief to the spot situation is expected from that quarter. Consumers and dealers have been scouring interior cities for small lots of tin, which have been selling at exorbitant prices. Small lots of Banca have changed hands at as high as 88c, while there are reports of as high as 99c being done. No supplies of Straits or Chinese 99 per cent are available. The situation steadily is growing more serious and some plants are already facing curtailment of operations.

The American Smelting & Refining Co. last Friday advanced its lead price to 6.75c, New York, 6.67½c, St. Louis. The outside market stiffened perceptibly, although the volume of business remains rather light. A good export inquiry has been in the market, but lack of bottoms is holding this business back. The outside lead market may be quoted as follows: Prompt, January and February shipment, 6.75c to 6.80c, St. Louis.

Since the first of the year galvanizers have shown a little more interest in their spelter requirements. On some days recently there has been almost an active inquiry for carloads. The geological survey issued preliminary figures for 1917, last week, showing production practically the same in 1917 as 1916, while stocks Dec. 31 slightly exceeded 50,000 tons. However, the statement had little market effect, as prices already are below cost, it is asserted. The market is about as follows: Prompt and January, 7.70c to 7.75c; February, 7.75c to 7.80c; March, 7.80c to 7.85c, St. Louis.

The antimony market has declined still further, with no demand of consequence, either from consumers or speculators. Spot may be obtained at about 14c to 14.12½c, duty paid, New York.

The outside aluminum market has gained strength, due to scarcity of supplies. Quotations are as follows: No. 1 virgin, 37.50c to 38.50c; No. 1 remelted, 36.50c to 37.50c; No. 12 alloy, 30c to 31c. The producer's contract price was advanced to 38c, effective Jan. 1.

Fill Your Draft Vacancies by Hiring

More Women for Your Plant

A Well-Paid, Highly-Specialized Type of Woman Factory Worker in a Cleveland Twist Drill Plant

The woman's invasion is upon us in earnest. Men are leaving mills and shops by the thousands to train for the world-wide fight for democracy. To fill their places, a great army of women for the first time is crossing the threshold of industry. That these women will fulfill their responsibilities all are agreed. But their coming brings problems, which executives charged with maintaining production must face.

BY MARGARET C. LYNCH

EACH day sees a fresh number of our young men leaving their chosen occupations to enter the great army which is to fight our battles overseas. This converts into a concrete proposition a question which up to now has been merely a hypothesis. The problem which in the past might have been phrased in these words, "If we send our young men to war, where are we going to get our workers?", has become, "Our young men are leaving! Where are more workers?"

We cannot leave their places vacant. To do so would be to court disaster. Thirty-nine months of war have conclusively demonstrated the vital necessity for a vigorous, active, thoroughly co-ordinated industrial organization behind the line. Production, we are all agreed, must not slacken; it must if anything be increased in volume.

How?

Who will fill up the benches and keep the machines in operation? Here as in Europe, there appears but one solution to the problem, and that is—woman. Work at the bench, the lathe or the drill press will be her part of the battle, and although it will be fought at home, its importance will be none the less vital.

This situation undoubtedly will have its unfortunate aspects. In the first place, under the spur of necessity, women will probably attempt work which is beyond their strength, and employers, used to dealing with men, will not be able to gage accurately the kind and amount of work that women should do. Also, many women will probably seek employment who have never had to work outside the home before.

The necessity for taking on unskilled labor at a time when speed is at a premium is unfortunate, but if the women of this country prove as ready to learn and as full of zeal as the English women have, their inexperience should not have a very serious effect on production.

What Can Women Do?

"What can women do?", the busy manufacturer is apt to ask at the outset. Fortunately, this question can be asked with considerable definiteness, for women are no new element in industry, even in America. They are employed effectively in operating light machine tools including shell turning lathes, drill presses, milling machines, shapers, etc. They are adept at inspecting, sorting and assembling operations. They are employed on punch presses, in stamping shops, for light forging and in armature winding departments.

During the month of July, 1917, the British Ministry of Munitions held an exhibition showing the work being done by women in England today. By means of photographs showing women engaged in various manufacturing operations, and through specimens of the finished products, this exhibit presented a comprehensive survey of the women's work in 14 different occupations. There were

BUSY AT A STRAIGHTENING MACHINE

internal combustion engines, including aircraft motors; motor trucks and accessories; steam engines; guns and component parts; small arms; gages, drills and cutters; metal aircraft fittings; aircraft woodwork; projectiles; optical instruments and glasswork. The exhibition covered practically the whole field of manufacturing and thus demonstrated that almost no arbitrary bounds can be set on "women's work." In some cases the women even set up their own machines. The work of the women shows thoroughness and a conscientious effort toward accuracy. In some factories where the workers consist entirely of women the output from the machines has far surpassed that for which they were originally designed.

The question now arises, under just what conditions should women work? Fortunately we can draw on the experience of our English cousins across the sea, and so avoid many costly errors and experiments. The whole problem has been investigated throughly by the British Health of Munition Workers committee. The committee collected a mass of facts from which valuable principles have been deduced. A brief summary of these principles follows:

Women are more effective when working on an eight-hour schedule than when employed on longer shifts. Day work is also preferable for women, but if they are placed on night work, the eight-hour three-shift system is better than the longer two-shift practice. The use of the three shifts makes it possible for women either to be employed on continuous night work or to alternate day and night work. Both systems have their advantages. The continuous system guarantees regularity of sleeping and eating hours. The alternate day and night work, however, gives every woman in the plant a chance to enjoy the more favored shifts.

The lunch hour should be liberal, with a few minutes for relaxation after the meal is finished. A rest period of 10 or 15 minutes in the middle of the afternoon is found advantageous, and

Women's Work in the Iron, Steel and Metal Industries

A survey of the field shows there are few shop operations women cannot perform satisfactorily. Their relative lack of strength is their principal limitation. Below is given a list of machines women are operating successfully, together with another list of apparatus which it is believed can best be handled by men.

Machines Operated Successfully by Women

Air Hoists
Arbor Presses
Balancing Tools
Bending Machines, Hydraulic
Blowpipes, Gas
Blueprint Machines
Bolt and Nut Machinery
Boring and Drilling Machines
Brazing Equipment
Broach Grinding Machines
Broaching Machines
Burnishing Machinery
Cartridge Machinery
Centering Machines
Chucking Machines
Cutting-off Machines
Cylinder Borers
Die Milling Machines
Drilling Machines
Elevators
Gages, Surface, Depth, Dial, Snap, Etc.
Galvanizing Machinery
Gear Cutting Machines
Grinding Machines, light
Hoists, Chain, Etc.
Jigs and Fixtures
Keyseaters
Knurling Tools
Lapping Machines, Power
Lathes, light
Looms, wire cloth
Milling Machines
Molding Machines, Core
Nipple Threading Machinery
Nut Tappers
Pattern Shop Tools and Machinery
Pipe Bending Tools
Planers
Polishing Machines
Presses, Shell Banding
Presses, Trimming
Profiling Machines
Punching and Shearing Machinery
Reamers
Relieving Machines
Rifle Barrel Machinery
Riveting Machines
Saws, Power Hack
Screw Driving Machines
Screw Machines, Automatic
Shapers
Sheet metal shears
Shell Making Machinery
Slotters
Spring Coiling and Forming Machinery
Swaging Machines
Tapping Machines
Testing and Inspecting Outfits
Thread Cutting Machinery
Thread Milling Machines
Thread Rolling Machines
Tinning Machines
Welding and Cutting, Oxy-Acetylene, light
Welding Machines, Electric, spot
Wire Working Machinery

Apparatus for Which Men Are Recommended

Annealing Ovens
Auto Trucks, Heavy
Bakers, Wire Coating
Barbed Wire Fence Machines
Benzol Recovery Plants
Blast Furnaces
Boiler Tube Machinery
Brickmaking Machinery
Briquetting Machinery
Bulldozers
Cableways and Tramways
Case Hardening Furnaces
Cement Machinery
Central Station Equipment
Centrifugal Coal Dryers
Charging Machines
Clay Machinery
Coal Mining Machinery
Coal and Ash Handling Machinery
Coke Ovens
Concrete Mixers
Cranes, Traveling
Cranes
Cupolas
Cutting Off Machines, heavy
Derricks
Digging and Excavating Machinery
Draw Benches, heavy
Dressers, grinding wheel
Engines, rolling mill
Flue Cutters and Flue Welders
Forging, heavy
Foundry Equipment, heavy
Furnaces, annealing and case hardening
Furnaces, electric steel
Furnaces, melting
Gas Producers
Grinding Machines, heavy
Hammers
Hammers, pneumatic
Heat Treating Apparatus
Hammers, steam
Hydraulic Machinery and Forging Presses
Lathes, car wheel
Lifting Magnets
Locomotives
Merchant Mill Equipment
Mining Machinery
Molding Machines
Open-Hearth Furnaces
Ore-Handling Machinery
Plate Rolls
Pipe Mill Machinery
Powdered Coal Equipment
Riveters, pneumatic
Rolling Mills
Sand Blast Equipment
Sand Conveying and Handling Machinery
Sheet-Mill Equipment
Steel Plant Construction
Steel Plate Construction
Structural Steel Work
Tire Welders and Benders
Tube Mill Machinery
Tumbling Mills
Wire Mill Machinery

WOMEN OPERATE HEAVY PUNCH PRESSES SUCCESSFULLY

if cocoa or coffee can be procured during this time the women go back to work much refreshed. This is especially true in any of the trades where there is danger from poisonous fumes, as a well-fed person is always better able to withstand the effects of these than an undernourished one.

As women generally react to their surroundings more readily than most men, the provision of pleasant places in which to eat and snatch a bit of rest will show results in output. It is also well to have a nurse or matron in charge of the rest room in case any of the women are taken ill. If an hour is allowed at noon this gives adequate time for lunch and for a few minutes rest before the afternoon's work is started, and this few minutes is very effective in bracing the women for extra effort in the afternoon.

People Like to be Clean

Every facility for personal cleanliness should be provided. The rooms maintained for this purpose should be so placed that the privacy of the occupants will be adequately cared for. Hot and cold water, fresh towels, plenty of soap, nail brushes, etc., add to the comfort and contentment of the workers and, therefore, to their efficiency. Particular care should be taken in this direction in plants where cartridges are made and fulminate of mercury handled, as well as in any other type of plant where poisonous materials are in use which might remain on the hands of the workers and prove dangerous through contact with food, etc.

As women, generally speaking, are not as strong as men, it has been found advisable to provide stools for them wherever possible. Also, it has been found that frequently machines which women have heretofore been unable to run because of injurious effects, can be made quite harmless by some slight alteration or by the addition of some simple appliance. To be sure that women are not injuring themselves by unsuitable work it is well to arrange for regular medical inspection, preferably by a woman physician.

In addition to doctor and nurse it has been found advisable in some places to include some women among the supervisors of female labor. Many plants, both in this country and in Europe, have a woman welfare worker on their staff.

It is attention to details which in the end is productive of the big results, and these are some of the details which the English manufacturers have found that it pays to study and work out.

The subject of wages has also received considerable attention in England, and the tendency is to pay the women on the same basis as the men have been paid for the same work. The slogan "equal pay for equal work," has been upheld by both men and women. Mixed motives probably actuate the male adherents of this principle. Some are undoubtedly sincerely desirous of seeing the women get a square deal, while others probably see as a result of lower wages a cheapening of production and a consequent lowering of the wages of male workers when they are ready to take up the reins again.

The British Munitions Supply committee has classified woman employes under two heads, women employed on woman's work and women employed on men's work. The committee has regulated the wages for both classes and for the latter the regulations have become law. Women on men's work must be paid the same piece rates as the men. They must be granted bonuses under the same conditions, and if employed on time schedule must be guaranteed £1 or $4.87 per week while learning and, therefore, unskilled.

Skill Promises Higher Wages

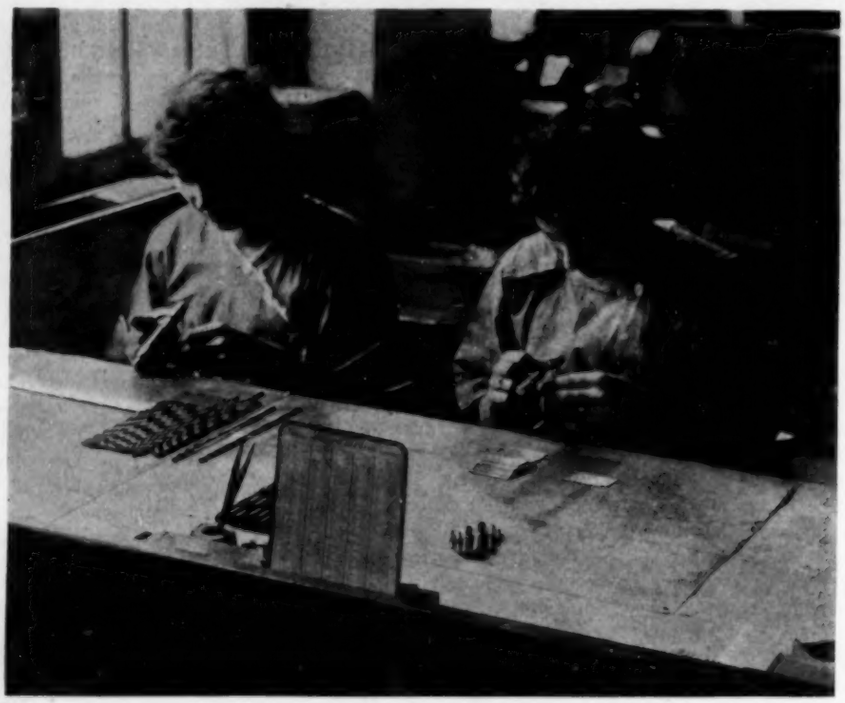
When a woman becomes a skilled worker, she must be paid on the same scale as the men. Claims have been made that in some cases employers have been guilty of so arranging the work that it is not identical with that done by the men. In such cases, because of some very minor difference in work a disproportionately large difference in wages has resulted. On the whole, however, one gathers that the women are receiving wages such as they never enjoyed before, in addition to very fair and considerate treatment in other ways.

Many English factories today have a preponderance of female help. Exhaustive investigations have been carried on to determine the type of work women are capable of doing, and to ascertain just what conditions are most suitable for securing the largest production while at the same time the health of the women is cared for.

In July, 1914, the number of occu-

A HIGHLY SKILLED DRILL PACKER

pied women in the United Kingdom was 5,020,000. In April, 1916, the number had risen to 5,490,000. This represents an increase in 21 months of war of 470,000, or about five times the normal peace-time increase. The metal industries show the greatest increase in the employment of females, with an advance of 88 per cent over the 1914 figures. The chemical group follows close behind with an increase of 84 per cent. The other industrial group show a relatively low rate of increase, the advance for all the "industrial" occupations being only 13.2 per cent. We have, therefore, a large number of women leaving the more strictly feminine occupations to take the place of male workers. As a result it was estimated that in April, 1916, there were 523,000 women in England directly replacing men, and at least 737,000 replacing men either directly or indirectly. In the United States the question of woman labor in the metal trades is beginning to present itself as a problem requiring our immediate attention. We are at the present time facing the same situation which our allies already have faced and partially solved. It appears that our method of solving the problem will be the same as theirs. It therefore behooves us to study their methods and those already in effect in this country.



WHERE DEFT FINGERS ARE REQUIRED—WOMEN TESTING DRILLS WITH MICROMETER CALIPERS

For years we have employed women in the core rooms of our foundries, and as the shadow of war becomes darker, more and more companies are replacing the men coremakers with women. It is said that women are being employed on light molding in some eastern foundries. This is unusual, however, and it has not yet been demonstrated whether or not women are capable of handling this work.

As the work in foundries frequently is too heavy for the average woman, the American Foundrymen's association has incorporated rules governing the employment of women in its official safety code. The code provides that no woman who is not in normal health shall be employed in any foundry, nor shall any woman be permitted to lift any object exceeding 25 pounds in weight, unless she uses mechanical means by which her physical effort is limited to exertion equivalent to that number of pounds.

It is in machine shops and metal working establishments of various kinds that women can be utilized to the best advantage. Here she is not confined to one kind of job, as our English neighbors have proved, but can find many outlets for her abilities. Here as everywhere she is hampered by her comparative lack of strength, but in work requiring skill, patience, delicacy of touch, or speed she can equal the male and in a great many cases prove his superior. To illustrate the work done by women in this country and the conditions under which they do it, it might be interesting to visit some of the various American plants who employ female workers and see for ourselves how it works.

The Cleveland Twist Drill Co., Cleveland, employs approximately 125 girls, and is very proud of them. Many of the girls have been with the company for from six to eight years. Most of them are not the type one would expect to find in a factory and one wonders how the Cleveland Twist Drill Co. manages to hold their services.

In the first place, the company selects its girls carefully. Girls that prove undesirable after employment are promptly discharged. Any girl who brings a friend to seek employment is required to stand sponsor for her. In this way the girls are safeguarded, as far as possible, against the entrance of new girls who might prove unpleasant associates.

In the second place, the girls do not come in contact with the men in the shop at all. The day begins at 7:00 a. m., 15 minutes after the men have gone to work, and ends at 4:40 p. m., 20 minutes before the men stop. The girls therefore have opportunity to be part way home before the men throng out from their own and neighboring shops. At noon the girls use their own lunch room, and it is very seldom that a girl is granted a pass to go outside the building at this time. She is therefore completely isolated as all the girls work together in one large bright room on the fifth floor of the building. The girls are employed exclusively in the inspection and packing departments. The work is light, requiring speed and dexterity rather than great physical strength. It is the type which is generally conceded to be woman's work in the factory. Four different operations are performed in the women's department. One group of girls is engaged in "laying straight" or sorting and arranging the drills. When this is accomplished the drills are sent on to another group who do hand burring. The drills are then sent to the inspection department where girls with calipers test them to 0.0005 inch. The rejected drills are either sent back, if the fault can be remedied, or discarded if it cannot be. The good ones go on to the packers. The packing, which is performed by a fourth group, is the final operation with the exception of checking. One girl does all the checking and she is responsible for all the drills that go out of the department.

The speed and accuracy displayed by an expert packer inspires wonder in the onlooker. The drills are placed in a neat pile on the table, from which the packer slides several so that they lie in a straight row in front of her.

Then, with a special tool, she separates out a certain number and almost with the same movement slides them into the envelope which she holds in her other hand. After the packages are checked and marked, they are ready for shipment.

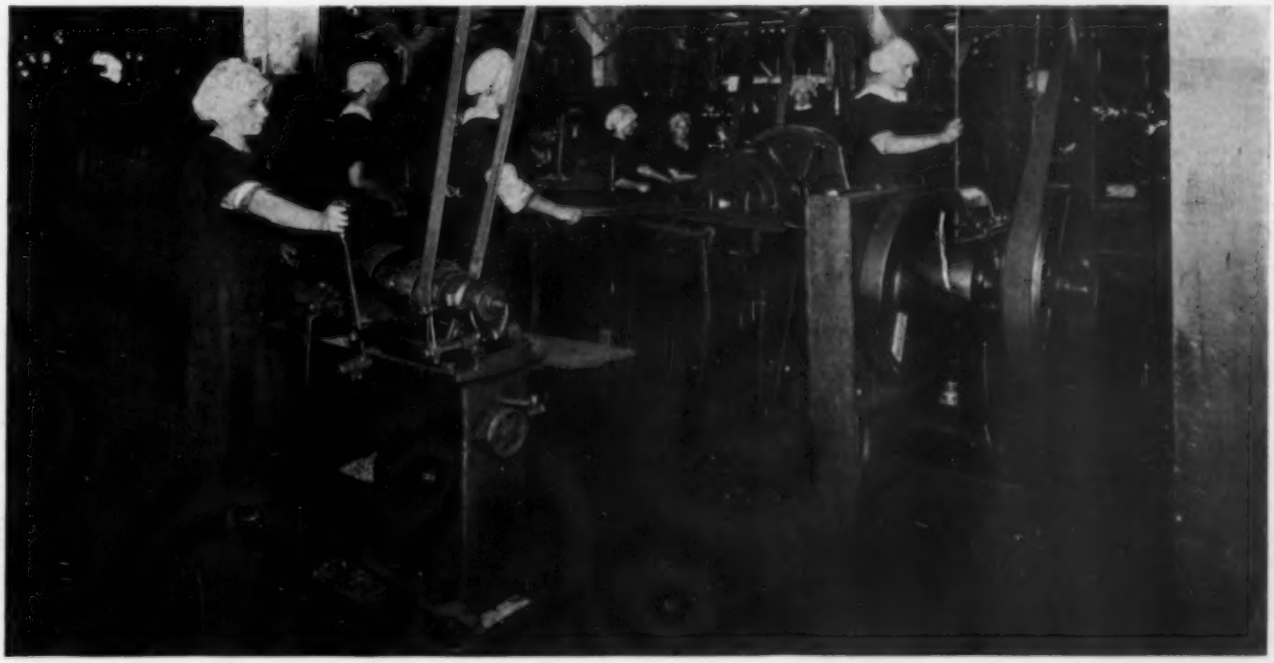
The monotony attached to this kind of work is its chief drawback. Even this does not weigh very much with an expert, however, for her movements become so nearly automatic that she can carry on a conversation at the same time that her hands are flying at such speed that it is difficult to follow their movements. The only other disadvantage is that the drills are greasy and therefore the work is not so clean as office work. Compared with many other types of work, however, it is desirable.

The girls are paid on a piecework basis. A minimum wage also is set. When a girl's production runs 500 drills over the normal average on which wages are based, her pay is automatically raised by increments of one cent an hour. Each month the girls receive a 10 per cent bonus and at the end of the year all the employes are paid a "grand bonus," based on their year's wages. Last year this amounted to 33 1/3 per cent, and this year the company expects to equal or possibly better this record.

Although the day starts at 7:00 a. m.

Two Types of Workers

The illustrations on this page show two distinct types of women factory workers. The women in the illustration at the top of the page are filing burrs off small drills. Quickness, dexterity and intelligence are necessary qualifications for this class of work. At the bottom of the page women are shown operating heavy shop equipment. Women of the strong, foreign-born, peasant type are best adapted to work of this character. Strong backs, steady nerves and ability to stand up at the machine are among the requirements for this work.



and ends at 4:40 p. m., the girls do not work a full nine hours. At nine o'clock work stops for 15 minutes. Lunch comes at 11:30. The lunch period is 40 minutes, which gives a little time for rest after lunch is over. At 12:10 p. m. work is resumed, but at 2:45 another 15 minute rest period occurs. The work then goes on without break until closing time. This makes in all 8½ hours of work, pleasantly broken up by rest periods. It is not surprising that under such conditions the employes are unusually faithful and even after they are married they sometimes return to work

How Women Do Heavy Work

A totally different type of work and a totally different type of worker are found within a stone's throw at the plant of the Cleveland Hardware Co. The output of the plant is largely small forgings. Here also women workers are not a new institution. For over 15 years they have been employed on what is, in many places, considered men's work. The attitude of the company is that if a woman has been accustomed to working long hours in the fields in Austria-Hungary she is not going to find eight hours at a punch press an exhausting job. It is, if anything, easier work than that to which she has been accustomed. It would be both cruel and foolish on the part of the employer to hire a girl who was not physically fit for this work. Therefore women of the strong peasant type are employed.

The hours of men and women are identical, each working an eight-hour day. The plant operates on the three-shift basis and women are employed on two of these. The eight-hour day has proved so successful from the standpoint of output that a longer day is not looked on with favor by the company. An effort is made to employ mature women for the shift running from 3:00 p. m. to 11:30 p. m. and, where possible, to hire women who have husbands working on the same shift. This obviates the going home alone at midnight difficulty.

Foreign Women Earn More

The women work on machines and also do inspecting. The company endeavors to choose its women carefully with reference to the type of work which they are to undertake. The women who do inspecting are more frequently Americans, but because the work is easier, the pay is less than that of the foreign women who operate machines. Punch presses, trimming presses, drilling, milling and reaming machines all are operated by female labor. About 200 women are employed in this work and they are found to be as skillful as men operators. This is explained by the theory that women possess more natural rhythm than men and they, therefore, adapt themselves more readily to the regular movement of machines. Safety guards are placed on all the machines and stools are provided so that the women may sit at their work if they desire.

The Cleveland Hardware Co. endeavors to make its employes as comfortable as possible. As the work is dirty a complete change of clothing is required for street wear. A locker is provided for each worker in which she can safely keep her street clothes during the day. Also the washing facilities are excellent.

The women can either bring their lunches or can buy them at the self-serve lunch counter. Whether lunch is brought from home or is purchased in the cafeteria, the women get their coffee at the plant, for this is served by the company, with sugar and cream, for one cent a cup.

LONG EXPERIENCE MAKES UNERRING FINGERS

A general store is operated by the company right in the building. Here, one is given to understand, an employe can buy anything from a pin to a house and lot, and that the number of employes, both male and female, who put their savings in real estate is surprising. The company store is particularly convenient for the women, who can make their purchases without the trouble of going outside the plant, or without reference to the closing hours of the corner store.

The wages paid the hardware company's women employes are on a piecework basis and range, on the presses, from $2.50 to $3.00 a day. The pay is higher than the same women could make cleaning or washing by the day, which explains to a degree why the women prefer this work In the case of the married women, the opportunity to work in the late afternoon and evening, and of having the morning and part of the afternoon in which to attend to housework makes the situation attractive

In Other Industries

Many other concerns are experimenting with the employment of women. At the plant of the Atlas Bolt & Screw Co., Cleveland, women feed the automatic screw machines. The pay for this labor ranges from 16½ cents an hour, minimum, to from $3.50 to $3.75 per 9-hour day. If the employe stays for 15 days she is paid a 5 per cent bonus. If she stays for three months an extra 5 per cent bonus is paid on all earnings during that period.

Outside the door of the Cleveland Tack Works a "girls wanted" sign is displayed. One hundred girls are inspecting small parts and operating light drill presses in the plant of the Maxwell Motor Co., Detroit. The Dayton Engineering Co., Dayton, O., has established a school for women workers where they are taught light machine work, and are paid the guaranteed day rate while learning. In the handling of light machinery or small parts, this company finds that women are superior to men.

The Cutler-Hammer Mfg. Co., Milwaukee, recently employed 200 girls to ascertain how satisfactorily they would be able to replace men taken by the draft. The girls are employed principally in two departments; in one on light machine riveting in connection with lighting specialties, such as push-button sockets, push-button plates, etc., and also on light assembling operations. In the other department they finish and inspect small insulating parts. Although the work is still in an experimental stage, the company believes that the efficiency of the girls compares highly and possibly surpasses that of men workers, because of the greater suppleness of a girl's hand.

Women Munition Workers in America

In the summer of 1916, nearly 4000 women were engaged in the munitions plants at Bridgeport, Conn. The Lincoln Electric Co., Cleveland, is employing girls to wind armatures of motors. The Link-Belt Co., Indianapolis finds women are more skillful in assembling small links into chains and handling packing for heat treating purposes than men The Chalmers Motor Car Co., Detroit, is using women as operators of light machine tools. The consensus of opinion seems to be the same, that on light work, the women

SHOP AND FACTORY WOMEN AT WORK AND AT REST

excel, and that up to the point where it becomes too heavy for them they are at least equal to the men.

The solution to the woman in industry question seems then to be, that given pleasant surroundings, reasonable hours, and good wages, women can be found to do practically all types of work performed in a factory, with the exception of that requiring very heavy lifting or continuous standing.

To make woman's labor effective the type of woman must be chosen carefully with reference to the kind of work for which she is destined; for machine and press work, women with strong backs and well developed muscles; for inspection, assembling, sorting, burring, or any other work of that type, women with supple hands and a quick and accurate eye.

Women have perhaps in the past performed as many types of work as they are capable of doing, for the employment of women in factories is not a new thing. However, she will now have a new incentive, and the scope of her labors, and the number of workers undoubtedly will become greater.

Wage Not Only Object

For the sake of both men and women, the wages for work identical to that performed by men should equal the wages of men. But a factor which will be of greater assistance in obtaining and holding female labor even than the matter of wages will be found in the little extra provisions made for the comfort and convenience of the worker. One girl who had been led away by the promise of war-time pay from a place she had held for some time, illustrated this by the remark she made on her return to her old place:

"Why Missis, no lockers—nails on wall! no lunch room! no nothing! I come back."

So she voluntarily returned to a place where more conservative wages were paid for the sake of the environment provided by the company. With suitable work, reasonable hours, fair wages and thoughtful provision for comfort, the result is willing workers to fill in the war-torn gaps.

When peace comes again a readjustment is inevitable. But it is an unfortunate fact that some of the men workers will not come back. Others, who will return, will not care to go back to their old jobs. Some will come back and need feminine support. In addition, a great many women will more than gladly retire from the factory when the return of a male supporter makes it possible. All these things will help in the great task of readjustment, which must be faced after the war.

Australian Steel Foundry Practice

BY A. M. HENDERSON

DURING the last six or seven years steel foundry practice in Australia has made great strides and at present several Australian foundries are producing steel castings which compare favorably with those made in England, Europe and the United States. Up to the present time only carbon steel has been used for castings and no systematic efforts had been made to produce alloys such as chrome and manganese steels. This apparent lack of progress is not a result of a scarcity of technical skill nor of lack of enterprise, but of a condition due to the many problems the steel foundries in Australia have encountered in developing their business, and in improving the quality of their product. This lack of development of the industry is partially explained by the total absence of any protective duty on chrome and manganese castings which are used for ore crushing and grinding purposes. Incidentally, it is for this purpose that 90 per cent of the chrome and manganese steel castings imported into Australia are used.

Lack of Standardization

To appreciate the reasons for the adoption of the steelmaking processes now used in Australia, it must be realized that every foundry has to adopt a process for producing steel which will give economical results under the prevailing conditions. In Australia the foundries have had to build up their business by satisfying customers that they could produce the required quality of material before they could obtain the security provided by prospects of future orders. The demand for steel castings calls for various grades of hardness and ductility and for castings varying in size from a few ounces to several tons. It will readily be seen under these conditions that the only processes suitable are those which may be operated intermittently, and are flexible in respect to the grade of steel produced. Standardization is a factor almost entirely absent from Australian steel foundries.

Because of the relative low cost of installation, the crucible process has been adopted very extensively in Australia. It was used there for over 20 years before the first side-blown converter was started. At present there are in Australia from 30 to 40 crucible steel foundries, 15 of which are regularly producing steel castings. There are seven side-blown converter plants in the country, two of which are government plants. One stock converter plant is already in operation and two or three others are being constructed. The electric furnace has had no influence whatever on Australian steelmaking methods. Its introduction has been of such recent date that the effect on foundry practice has not been noticeable.

The crucible furnaces used in Australia are built in batteries of from 2 to 10 holes, and are placed entirely below the floor level with the exception of the stack. Each hole is designed to melt two crucibles and, having an individual stack, may be worked independent of adjacent furnaces. Hard coke is used as a fuel, some 3000 to 4000 pounds being necessary to melt one ton of steel.

Details of Crucible Practice

The melting hole is lined with specially shaped fire brick which may easily be replaced. The furnace covers consist of fire brick and steel frames; these require constant renewing. The crucibles stand on fire brick blocks resting on the furnace fire bars which are approximately 1 inch square and are made of mild steel. In general, plumbago crucibles holding when new about 180 pounds of steel are used in these furnaces. As these crucibles deteriorate their capacity decreases to approximately 140 pounds; the average is 160 pounds for all heats. These crucibles last from five to eight heats depending upon the grade of steel being melted. In Australia as elsewhere the material melted in a crucible consists of boiler-plate punchings and other steel scrap and gray pig iron. The pig iron and as much as possible of the steel is packed into the cold crucibles. The remainder of the charge is added later on when the material in the crucible has melted down.

The furnaces are started with a wood fire. The crucibles are lowered into place by means of long tongs, suspended from an overhead lever. Covers are

A resume of a paper reprinted from the *Proceedings* of the Society of Chemical Industry of Victoria. The author is manager, Commonwealth Steel Co., Sydney, Australia.

placed on the tops of the pots and the furnaces are filled up with coke which is packed about the crucibles. Fresh coke is added at intervals and the remainder of the steel charge is added when the first packing of pig iron and scrap has melted. After the metal is melted, the firing is continued for some time to allow the metal to free itself of any dissolved gases which otherwise would tend to form blowholes in the castings. After firing for a sufficient length of time, the crucibles are lifted from the furnace and a small quantity of alumina ferric and ferromanganese is added. The crucibles are then transferred to a pouring tank and the small amount of slag is skimmed off. The metal is then poured into molds. The furnaces are allowed to burn out and after cooling are cleaned and prepared for the next day's melting.

A typical charge used for crucible steel is as follows: Pig iron, 20 pounds; scrap cast and runners, 40 pounds; scrap mild steel, 100 pounds. The composition of the steel produced by the crucible method depends largely upon the average composition of the charge. The metal, however, absorbs carbon from the crucible and the carbon content of the steel always increases from 0.2 to 0.6 per cent during the melting. It is difficult by the Australian process to obtain low carbon steel which approaches the commercial mild steel plate in softness and ductility. It is perhaps for this reason that the converter process is making such inroads upon the crucible founders' business in Australia.

For medium and hard steels which do not have to conform with standard specifications of strength and ductility the crucible process still has a large field of usefulness in Australia. It is interesting to note the manner in which several of the crucible founders developed their business. They were not technically trained men; knew nothing of chemistry, but came to Australia, worked in new materials, new sands, trained their own assistants, and for many years supplied all the engineers' requirements for steel castings.

Cost Considerations

Under Australian conditions over 50 per cent of the cost of producing castings is accounted for by the cost of the steel. In several well-organized foundries, however, the regular production of high-grade steel is no longer a hit or miss process, but a closely controlled metallurgical operation. In the Australian steel foundries using converters, every blow of steel is sampled and the carbon and silicon, together with the manganese content, are regularly determined. Phosphorus and sulphur are determined frequently but not on each blow. The most frequent cause of unsatisfactory steel castings in Australia is due to the difficulties experienced in obtaining regular and uniform supplies of material. This is particularly true in regard to molding sand. Soft converter steel castings are poured at a temperature of about 1600 degrees Cent. and at this temperature only highly refractory materials can be used for molds. The importance of this problem to the Australian foundrymen is indicated by the fact that fully 70 per cent of the defective steel castings are due to sand difficulties. The majority of steel foundries, especially the crucible foundries, do not seem to recognize this fact and are endeavoring to overcome what really are sand defects by altering their melting practice.

There is a divergence of opinion among steel founders over the question of bottom pouring and lip pouring. Bottom pouring is universal for casting ingots, but in this case a large number of similar ingots are being poured and there is no necessity to vary the rate of pouring. For steel castings, however, nearly every job should be poured at a different rate and hence the rate of pouring is of essential importance. For this purpose it is generally realized that better control of the pouring rate is obtained when pouring over a lip than when pouring through a hole in the bottom of the ladle. Furthermore, the metal in the bottom pouring has a considerable head behind it and leaves the ladle at a velocity which seriously cuts the sand runner provided in the molds. On the other hand, there is very little likelihood of any slag going into the mold with bottom pouring which may readily happen with lip pouring if skimming is not carefully done.

Practically all crucible steel castings and also converter steel castings containing over 0.4 per cent carbon are annealed. Converter steel castings having less than 0.4 per cent carbon may or may not be annealed according to the service which they are designed for. Coke-fired annealing stoves are customarily used in Australia. The castings are packed in the furnace and the side walls bricked up, or a removable top made in sections placed on the furnace. In only two of the foundries have pyrometers been installed to assist in governing the stove temperatures. So long as annealing ovens continue to be operated by guesswork, it is little wonder that castings fail to meet the standard specifications and the cause of failure has been a mystery.

Steel founding is no child's play, the daily crop of problems raised and difficulties to be overcome being considerably more than encountered in most manufacturing enterprises. Steelmaking today cannot be undertaken by men without technical training. Notwithstanding the many alluring prospects presented by those who are anxious to sell and install foolproof steelmaking processes, there are none which may be so classified and which do not require closest attention of a practical metallurgist in order to produce high grade castings.

Want Men for Service

The army and navy staff departments continue to demand men of engineering experience, especially in industrial lines. In calling attention to this, the United States Public Service Reserve, Washington, D. C., points out that a man of engineering experience has a rare combination of opportunities open to him, which are not open to the average patriotic American, as follows:

1. To serve the country in his most effective capacity.

2. To keep in touch with his own profession, with the result that his patriotic service will not have caused him to become rusty by the time peace returns.

3. To become a commissioned officer and receive much better pay than the average man who has wholly subordinated personal interests and now works for the national good.

4. To perform his service usually without leaving the United States.

Plant Begins Work

The new Victory plant of the Bethlehem Shipbuilding Corp., Ltd., Squantum, Mass., for the construction of torpedo boat destroyers, work on which has progressed rapidly, began actual shipbuilding operations this week. The completion of the plant construction will go forward with the work of the shipbuilders. It is announced that 6000 workmen will be employed at once in destroyer building.

The malleable iron plant of the American Radiator Co., Buffalo, has been equipped with annealing ovens provided with burners for the handling of powdered coal. With a good grade of Kentucky bituminous, averaging 12,500 B. t. u. test, the average consumption is said to have been one pound of coal to 3.5 pounds of castings in a preliminary test with damp brick furnace walls. The coal burners used are manufactured by the Powdered Coal Engineering & Equipment Co., Chicago.

Analysis of the Condenser Problem

The Advantages of the Different Types of Condensers Are Outlined—The Cost of Operation, Based on Thermal Efficiencies, Figures in the Choice of Equipment

BY D. D. PENDELTON

THE following discussion on the choice of condensers for steam plants is an abstract of a paper on "Modern Condenser Practice," which was presented before a recent meeting of the Engineers' Society of Western Pennsylvania. The author, D. D. Pendelton, is district sales manager, Wheeler Condenser Engineering Co. Carteret, N. J. As the type of condenser and the degree of perfection to which it operates determine largely the efficiency of a steam plant, the selection of the most suitable auxiliary equipment is one of prime importance to plant engineers.

For high duty work, 28-inch vacuum or better, the type of condenser to be selected should be thoroughly studied, taking into consideration the engineering, physical and commercial conditions. The question of water is of prime importance and should be studied as to: Quantity, kind, clean, dirty, acid, etc.; pumping head; source, natural or artificial; average temperature. With these points settled, the commercial vacuum which is practical to maintain may be determined, always bearing in mind that the average log of a properly designed, rated and operated surface condenser will show better vacuum than a jet machine and in turn better than a barometric machine, due principally to the conditions as to air leaks, and exhaust piping losses.

Surface Condensers

The surface machine also allows the condensate to be reclaimed as pure, distilled water for boiler feed, thus requiring only a moderate amount of make-up water to be treated in cases of unsuitable boiler feed supply. There is no limit to the size of surface equipments—they are now being made in sizes from 100 square feet up to 70,000 square feet.

The barometric condenser is limited in size by the expensive exhaust piping. The low level jet is also limited as to size. This is due to the removal or tail pump and air pump limitations and to the power necessary for driving the pumps. Units of 7500 to 10,000 kilowatts seem to be the practical limit for these pumps, although there have been installed in certain cases twin jets of 20,000 kilowatts capacity.

A 20,000 kilowatt turbine consuming 12½ pounds per kilowatt hour or a total of 250,000 of steam would require for surface work 31,250 gallons of water per minute at 15-degree difference, with 70-degree water and 28-inch vacuum, against a 10-foot head. This would require approximately 100 horsepower, the air and condensate pump of the hydraulic type requiring 140 horsepower additional or a total of 240 horsepower with one set of auxiliaries.

The jet at a 5-degree difference would require 20,000 gallons per minute against a 40-foot head if no booster pump were required, or approximately 400 horsepower. The air pump would require about 250 horsepower more, making a total of 650 horsepower.

After considering the local conditions, the choice of a condenser should be made upon the power requirements of operating cost, always considering the points mentioned in the preceding paragraphs. Assuming a case of 40,000 pounds of steam per hour, 28-inch vacuum with 70-degree water, the power requirements are as follows: Surface condensers at 15-degree difference would require 5000 gallons per minute. Since the discharge should be sealed, a working head of 10 feet should be ample, under ordinary circumstances, requiring a water horsepower of 12½. At an efficiency of 75 per cent on the centrifugal pump, a pumping horsepower of 16 2/3 would be required. Using the wet and dry system the air pump would require approximately six horsepower, the condensate pump about 2½ horsepower, making a total of approximately 25 horsepower. The low type jet owing to the low efficiency of the removal pump would require more power.

At a temperature difference of 5 degrees, however, less water, or 3100 gallons per minute would be required. A head of 36 feet being the discharge head from the condenser, plus friction would make approximately 27.9 water horsepower. The efficiency of the removal pump being about only 50 per cent, it would require a total of 55.8 horsepower. The air pump, however, would be approximately twice as large as for the surface condenser and would require 12 horsepower giving a total of 68 horsepower for the jet system. The barometric type would require the same amount of water, but the water must be lifted to the condenser head using the total static head plus suction and lift on the pump, less the suction effect of vacuum. This usually can be considered a net head of say 40 feet, making a total of 31 water horsepower; and at an efficiency of say 70 per cent on the supply pump, a total of 44½ horsepower would be required.

The same air pump would be used as in the case of the jet, requiring 12 horsepower, making a total of 56½ horsepower. The hydraulic or other types of air pumps and the steam jet would materially increase the air removal power requirements.

Summing the case up we have: Surface, 25 horsepower; barometric, 65½ horsepower—an increase over the surface of 126 per cent low type jet, 68 horsepower plus an increase over the surface of 172 per cent. The relative costs would be: One hundred per cent for the low type jet; 100 per cent for barometric, not including the exhaust piping; and about 200 per cent for surface equipment.

The rating of the surface of a condenser depends principally upon the amount of heat that can be dissipated by each square foot of surface. This being determined by the heat transfer per degree difference between the mean circulating water temperature and the temperature of the vacuum to be attempted.

Condenser Tubes

The tubes in surface condensers have been a source of much thought and experiment. The material used should be pure electrolytic copper, high grade spelter, having not over 0.07 per cent lead, 0.03 per cent iron and .05 per cent cadmium, and pure tin. No scrap should be used. The most common mixtures are: Pure copper, muntz metal (60 per cent copper, 40 per cent zinc); admiralty (70 per cent copper, 29 per cent zinc and 1 per cent tin). The standard tubes usually are No. 16 or 18 B. w. g. in thickness and ⅝ inch, ¾ or 1 inch outside diameter, depending upon conditions.

The quantity of water available and the temperature usually determine the vacuum which is practical to maintain. This quantity can be varied for the same vacuum by varying the assumed terminal temperature difference, which will directly vary the surface for any

given rate of heat transfer. A terminal temperature difference of 5, 10, 15, or 20 degrees can be used. A ratio of heat transfer from 300 to 500 may be employed. For standard commercial work, a terminal temperature difference of 15 degrees is usually conceded the best practice and a heat transfer of 300 to 350 is conceded the most conservative.

Water Velocities

Eminently good engineers have advocated water velocities for surface condensers as high as 10 feet per second, stating emphatically that 8 feet is conceded practical and standard. From tests of large condensers, a water velocity of 4.7 feet per second seems to be the average; for the purpose of discussion, say 5 feet. Now suppose that this velocity be increased to 8 or 10 feet; the power requirements for such conditions would be excessive. All talk of 8 to 10 feet per second seems to be absurd, in view of the fact that there are very few commercial and practical plants operating under such conditions.

Water quantities are usually figured at a 5-degree terminal difference as standard practice, although results have easily been maintained at the vacuum temperature or a 100-per cent water efficiency.

The removal or tail pump, as already stated, requires the larger amount of power—usually on river conditions the water has to be supplied to a cold well by a booster pump, drawn into the condenser by suction and expelled against the vacuum plus any friction and outside static head. The booster pump power has not been considered in the example of power requirements for the types already given.

Air Pump Requirements

The air pump is required to remove air coming in with the water as well as air entering through leaks in the exhaust or other piping and air entering with the steam. Here also the water quantities are figured as in the low type jet machines. The water supply can be more easily figured for it can be pumped directly to the barometric head without booster or auxiliary pumps. The air pump requirements are the same as in the low type jet.

After fixing the type of condenser to be used, the next step should be a study of the auxiliaries for equipment. These can be divided into two kinds: Motor driven and steam turbine or steam engine driven. It is very easy to analyze the power requirements of the motor-driven air, circulating and hotwell pumps for the electrical energy is taken directly from the switchboard. Steam turbine or engine drives, however, bring up the question of the return of heat to the feed water or heat balance and this so often complicates matters that we lose sight of the true power consumed. Roughly, 90 per cent of the steam of the auxiliaries will be returned as heat to the feed water provided there is enough water of a suitable temperature to absorb this heat. The amount of feed water available for absorbing this heat varies with the load on the main unit. The result is that at times of light load there is a grave danger of showing an excess of exhaust steam. This mitigates against the use of steam-driven auxiliaries to some extent and had led to the development of combined drives using turbines and motors.

In the case of steam jets, this device takes boiler steam, compresses the non-condensible vapors from the condenser and discharges the whole into a feed water heater working at atmospheric pressure. All of the heat except that lost in radiation and leakage is returned to the feed water and for that reason it would seem that the amount of steam required made little difference in the general economy of the whole plant. However, as pointed out previously, care must be taken to make certain that the available steam for heating the feed water is not excessive. One way of analyzing the steam consumption of such an apparatus as a steam jet air pump is as follows: Suppose the pump takes 3 per cent of the main turbine steam and that the main unit is rated at 5000 kilowatts or say 60,000 pounds of steam per hour, the steam jet, therefore, requires 1800 pounds of steam per hour. If this steam were expanding through the same range, that is from boiler pressure down, in the main turbine, it would produce about 150 kilowatts per hour. This then, in a sense, is the power consumption of the air pump and is to be compared with the power that some other type of pump would require for the same condition.

The efficiency of the booster pump for the low type jet and the supply pump for the barometric can be assumed as standard, consistent with good centrifugal pump design at a given head and quantity. However, the efficiency of the removal pump for the jet, owing to the slow entering water velocities in the impeller when pumping from a vacuum, is seldom over 50 per cent. The barometric, therefore, as far as power requirements are concerned is more efficient than the jet and less efficient than the surface. No condensate is reclaimed for boiler feed purposes in either case.

Where water supply is a serious problem some artificial method of cooling a given supply of circulating water is employed. This is done in several ways: Cooling towers of the natural draft enclosed type or of the natural draft open or rack type, forced draft, and combined forced and natural draft. In standard cooling tower practice it has been determined that with the air temperature at 75 degrees Fahr. and at 70 per cent relative humidity, the most economical vacuum is 27 inches, based on a 30-inch barometr, or a vacuum having a temperature of 115 degrees Fahr.

Practical Cooling Limits

Rating all condensers on a 5-degree difference—surface, jet or barometric—thus requiring the minimum amount of water, it will be necessary to cool the water from 110 degrees Fahr. Commercially, under the given air conditions, it has been found practical to cool to only 85 degrees Fahr. or sometimes to 80 degrees Fahr., giving a 25 or 30-degree cooling range, which with steam at 1000 B. t. u. per pound would require 25 and 33.3 pounds of water per pound of steam, respectively. The type of equipment to select would depend upon existing local conditions, such as space available and power consumption.

The natural draft open type of cooler requires more ground space and can be placed only where the vapors and driftage will do no harm to surrounding buildings or property. This type requires a pumping head of approximately 30 feet and no other power. The natural draft enclosed chimney type takes less ground space, the chimney or stack is usually about 75 feet high.

Area of the Cooling Pond

It is impossible to state generally the area of a pond necessary for a given quantity of water, but generally speaking, at a working pressure on the spray nozzles of 6 to 7 pounds, a pond of 3 square feet per gallon of water sprayed will have to be used. The area of a natural cooling pond is obviously very large as the heat dissipated per square foot depends upon the relative humidity, the temperature of the water and the velocity of the air currents. These are naturally, on account of varied conditions, very discordant.

In any water cooling device 90 per cent of the cooling effect is through evaporation and it is, therefore, vitally necessary that sufficient unsaturated air be given free access to the proper quantity of water. The air in all cases should go off the tower or pond in a saturated condition.

G. W. McClure Son & Co., Pittsburgh, have prepared plans for relining four hot blast stoves of the Wheeling Steel & Iron Co., Wheeling, W. Va. The stoves which are of the Crooke & Massick type will be changed over to the McClure type.

Heat Treatment of Heavy Forgings

Grain Growth is an All Important Factor in Heat Treatment of Steel—Small Forgings Require Painstaking Care—Engineers Should Co-operate With Metallurgists and Steel-Makers When Heavy Machine Parts Are Designed

BY SIR WILLIAM BEARDMORE

IN the heat treatment of large forgings there are no metallurgical principles involved which do not apply with equal force to the heat treatment of small forgings. Such differences as exist are entirely due to the limitations which large forgings impose on the practical conditions under which the heat treatment is carried out. For every class of forging it is desired that the material from which it is made should give the mechanical tests required by a suitable choice of composition, but in addition it

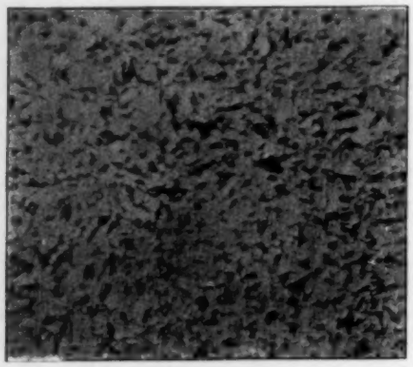


FIG. 1 — OUTSIDE SKIN OF 18-INCH OIL-HARDENED SHAFT—MAGNIFIED 100 DIAMETERS

is most necessary that the material should be in such a physical condition that brittleness and the chance of sudden failure should be reduced to an absolute minimum.

In carbon-steel forgings produced to meet a definite mechanical test specification the steel must possess the least crystalline growth or the smallest grain size, and the object of all heat treatment is to confer this condition on the forging before it leaves the steel works. It is well known that, at any chosen temperature, the time the material is kept at its heat and the time taken to cool down to normal temperature again have an all-important influence on the grain size. It is for this reason that in large forgings all the difficulties of heat treatment are magnified, and it is believed that a limit is ultimately reached in the size of the forging beyond which a plain carbon steel cannot be used with safety, and the use of an alloy steel becomes imperative.

The slowness with which heavy masses of steel cool results in large crystal grains at the center of the mass. To avoid this, recourse has to be made to oil-quenching to hasten the cooling and to diminish the size of the grain, while a subsequent reheating is generally necessary to remove the hardness introduced by the quenching operation. With small forging a simple annealing will put the material into the condition which will give satisfactory and safe results, but for large forgings some form of heat treatment is very necessary to produce the best results.

It is not sufficiently realized by engineers that in plain carbon steel the effect of oil-quenching is not uniform over the cross-section, but diminished as the center is approached. With very large forgings a stage is reached at which the quenching effect at the center is so small that it is insufficient to confer any benefit on the material, and it becomes impossible to guarantee the uniform results which are wanted. That this effect is a real one can be seen from the accompanying photomicrographs of a large oil-treated shaft and from the tests taken. This shaft tested was 18 inches in diameter and of the following composition: Carbon, 0.18; manganese, 0.65; silicon, 0.10; sulphur, 0.048, and phosphorous, 0.037 per cent. The shaft was heated to 1501 degrees Fahr. and held at that temperature for two hours and then cooled in oil. Tests were taken from the outside skin and center and gave the following results:

	Elastic Limit.	Ultimate Stress.	Elongation on 2 in.	Reduction of area.
	Tons per sq. in.	Tons per sq. in.	Per cent	Per cent.
Outside ...	17.5	33.1	27.0	53.1
Center	15.0	29.0	31.0	46.0

The structures of this shaft are given in the accompanying photomicrographs. Fig. 1 and Fig. 2 show the outside and inside structure, respectively. The tests taken from the center of the shaft have a lower tonnage than those from the outside, due to the fact that the quenching is not so effective. With a higher carbon steel it can be understood that the difference will be greater.

The effect of work is very important, and there is an intimate relation under practical conditions between the grain condition of a forging and the amount of work which has been put on it during forging. For the very best results the ratio of the cross-section of the ingot and the largest cross-section of the forging should have a minimum value, which should not be less than three. Preferably it should be as great as possible, but this cannot always be adhered to, since for large sizes it is limited by the maximum size of ingot with which the presses can deal and sometimes by the shape of the forging itself. For an ingot 83 inches in diameter the maximum size of the forging should not exceed 48

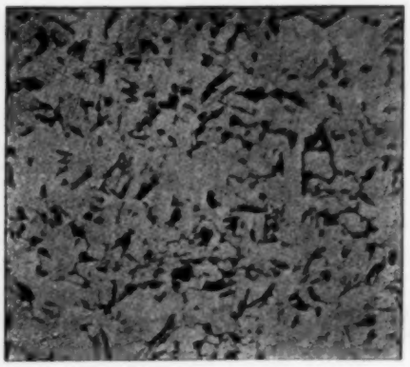


FIG. 2—INSIDE SKIN OF 18-INCH OIL-HARDENED SHAFT—MAGNIFIED 100 DIAMETERS

inches for the best practice. From a steelmaker's point of view larger forgings than this should be built up rather than manufactured in one piece. In this connection the cause of commercial efficiency would be better served if engineers in bringing out new designs in heavy steel construction, would consult the metallurgist and the steel manufacturer as to the best method of using their combined knowledge in the design and production of special requirements.

Though not strictly a forging, the following example illustrates very well what has been said above regarding the heat treatment of heavy forgings. An order was received which specified steel discs 55 inches in diameter and 11 inches thick with a mechanical test as follows:

Yield-point.	Ultimate stress.	Elongation (on ratio $\frac{\text{length}}{\text{diameter}} = 10$).
Tons per sq. in.	Tons per sq. in.	Per cent.
23	45	20

These discs were required to revolve at a high speed, and for magnetic rea-

A paper read before the Institution of Mechanical Engineers, London, Eng., March 16, 1917.

sons it was necessary to use a carbon-steel. The ingots were forged and then rolled to size from material of the following composition: Carbon, 0.53 to 0.54; silicon, 0.18; manganese, 0.50; sulphur, 0.029, and phosphorus, 0.040 per cent. These ingots were given a heat treatment after this operation, which consisted of heating to 1436 degrees Fahr. for 2 hours and cooling in oil, followed by heating to 1022 degrees Fahr. for 4 hours and cooling in air. Tests were taken from the center of the slab midway between the two surfaces, and results from this test are as follows:

CROSS TEST

Yield-Point	Ultimate Stress.	Elongation $\frac{\text{length}}{\text{diameter}} = 10$	Reduction of Area.
Tons per sq. in.	Tons per sq. in.	Per cent.	Per cent.
23.6	42.3	14.0	39.3

Fig. 3.	Yield-Point. Tons per sq. in.	Ultimate Stress. Tons per sq. in.	Elongation on 2 in. Per cent.	Reduction of Area. Per cent.
A ..	28.1	46.2	28.0	52.4
B ..	27.9	46.0	27.0	44.4
C ..	27.2	46.6	25.0	47.2
D ..	26.4	46.0	26.0	42.0
E ..	26.8	46.2	27.0	44.4

These results were the best that could be obtained, and were below the specified tests. There were two reasons for this failure. The carbon was too low and the thickness of the slabs too great to allow the oil-quenching sufficient time to be effective. Another ingot was therefore cast, from a higher carbon material, having an analysis as follows: Carbon, 0.62 to 0.63; silicon, 0.25; manganese, 0.70; sulphur, 0.023, and phosphorus, 0.024 per cent. This ingot was forged and rolled to 5½ inches thick to the size given in Fig. 3. In this way it was sought to avoid any unsoundness that might exist down the center line. At the same time the test specification was amended so that the elongation required was 22 per cent in 2 inches instead of

$$20 \text{ on a ratio } \frac{\text{length}}{\text{diameter}} = 10.$$

The plate was heated to 1625 degrees Fahr. and kept at this temperature for one hour and cooled in oil. It was then heated to 1400 degrees Fahr. and kept at this temperature one hour and cooled

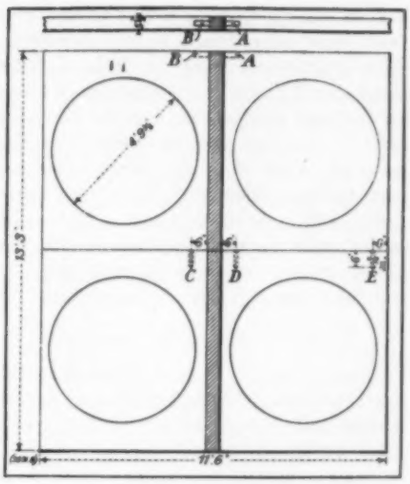


FIG. 3—FORGED AND ROLLED SLAB USED FOR TESTS

in oil. A third heating was then given the plate and the temperature was raised to 1184 degrees Fahr, and maintained for eight hours and the plate allowed to cool in air. The tests which were made on this plate are shown in the accompanying table, and refer to the corresponding letters in Fig. 3.

Work Is Important Factor

These results are satisfactory according to the test specification, and show the improvement effected by slight changes in the method of manufacture. The improvement due to rolling to a smaller thickness alone was also seen when first material containing 0.53 to 0.54 per cent carbon was rolled down from 11 to 5½ inches, and then retreated in the same manner, for it gave the tests as follows:

	Yield-point Tons per sq. in.	Ultimate stress Tons per sq. in.	Elongation (ratio length 10) Per cent.	Remarks In thick.
Length	26.3	44.9	15.8	5⅛
Cross ..	25.7	442.	16.5	5⅛
Cross ..	23.6	42.3	14.0	11

This result could have been still further improved by decreasing the thickness to 3 inches, but it shows how important the effect of work is on carbon steels, and how it may make just that difference between success and failure. For high-tensile material, that is, material over 40 tons strength, where the factor of safety is limited owing to the special conditions under which the material has to be employed, it will generally be safer to use an alloy steel, since for the same tonnage a very much tougher material can be developed. But for material whose tensile strength is below this figure there is not the same necessity, and excellent results can be obtained from oil-treated low-carbon steel.

Specifications of Rotor Spindle

Fig. 4 indicates the outline of a large rotor spindle which was made to the following test specifications: Yield point, 20 tons per square inch; ultimate stress, 36 tons per square inch; elongation on 2 inches, 24 per cent. It will be seen from the drawing that the largest diameter was 3 feet 8¼ inches, and the minimum diameter only 11⅛ inches, so that if such an ingot were used as would give the requisite amount of work for the largest section, the amount of time and money spent in forging down this ingot to 11 inches would be out of all proportion. In this case, as in many other cases, the best metallurgical conditions are incompatible with the best commercial conditions, and a compromise has to be effected. An ingot 60 inches in diameter was used of the follinw composition: Carbon, 0.38 per cent; manganese, 0.39 per cent; silicon, 0.21 per cent; sulphur, 0.029 per cent; phosphorus, 0.044 per cent. In the heat treatment of this job, and of jobs having similar shapes, when the forging is put into the furnace the time taken to heat up the heavy center section is much longer than the time taken to heat up the end sections. For instance, the end-pieces 11 inches in diameter could be heated up in about 4 hours, while the center would take about 20 hours to reach the same heat. Before the forging would be uniform the end-pieces would have been at their heat for 16 hours, and would have grown such a crystalline grain in consequence that any good effect of the oil treatment would have been annulled. To avoid this the ends were covered with asbestos sheets, leaving only the center exposed when the forging was charged into the furnace, and this sheeting was removed after 15½ hours in the furnace, so that the forging attained its heat uniformly as a whole,

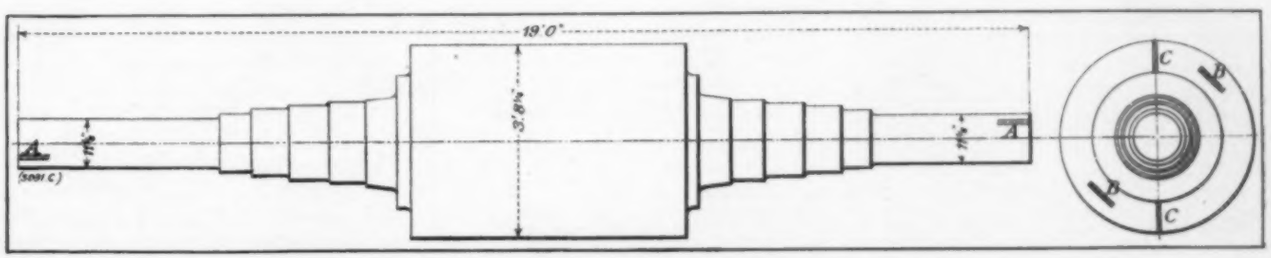


FIG. 4—DETAILS OF LARGE ROTOR SPINDLE USED IN TESTS

and the crystal grain in consequence was uniform throughout.

The test results are as follows:

Fig. 4.	Yield-Point. Tons per sq. in.	Ultimate stress. Tons per sq. in.	Elongation (on 2 in.). Per cent.
	22.6	38.8	27
A.....	22.6	38.8	27
	22.8	39.2	27
B.....	22.8	39.2	28
	22.4	38.8	28
C.....	22.4	38.8	30
	22.4	35.8	24

A refers to length tests taken one from each end of the forging, B. to tests taken circumferentially from a ring taken from the center part after treatment, and C to tests taken radially from the same ring. In both B and C tests two tests were taken from opposite diameters. This rotor was heated to 1472 degrees Fahr. for 2 hours, and cooled in oil. The center part attained its heat in 19 hours and 30 minutes, and the ends were uncovered after 15 hours 30 minutes, so that they attained their heat simultaneously with the center part. The rotor was then heated to 1022 degrees Fahr. in 11 hours and 30 minutes, and kept at that heat for 2 hours.

Troubles Caused by Distortion

A troublesome feature of large forgings which have been heat-treated is the distortion which takes place, due to internal stresses probably set up by the operation of quenching. On machining the forging, and especially on removing the outside surface, these stresses are partly relieved, and the forging distorts and takes up a new shape under the influence of the forces still left in the material, so that it loses straightness and generally adds to the time occupied in machining. It is advisable on this account to rough-machine the forging after treatment, and then to re-anneal it before the final treatment. Allowance for this re-annealing can be made on the first testing, and where the final machining is intricate and accurate it will be found to repay the cost.

Home Mines Yield Much Manganese Ore

DOMESTIC manganese ores which long have been relegated to the background by the more attractive high-percentage mineral imported from India and Brazil now have reached an important magnitude of production. With a view to determining the practical importance of the domestic output of manganese ores, the United States geological survey is collecting statistics of production every three months. The canvass for the quarter ending Oct. 1, 1917, is just completed and the statistics for both manganese and ferromanganese ores for the first nine months of 1917 are set forth in the accompanying table.

A large increase in the number of shippers and in the shipments of ore of each grade over those reported for the first six months of the year is shown. In 1916, only 26,997 tons of high-grade manganese ore was shipped by 55 operators but in the first nine months of the present year 70,225 tons was shipped by 88 operators and the reports received indicate that the shipments for the year will be about 122,275 tons. In September the production of high-grade ore was about 14,000 tons; in November it was nearly 17,000 tons.

Predicted Shipments for 1918

Inquiries made by the survey indicate that the shipments in 1918 will be between 175,000 and 200,000 tons. The 70,225 tons shipped in the first nine months of 1917 contained an average of 43.6 per cent manganese 2.8 per cent iron, and 13.7 per cent silica, and nearly all of it was used to make ferromanganese. Of manganese ores containing 15 to 40 per cent manganese, 380,169 tons were shipped in the first nine months of 1917 by 58 operators, against 176,130 tons shipped by 41 operators in the entire year of 1916. The ore contained an average of about 18.6 per cent manganese, 29.5 per cent iron, and 12.5 per cent silica. Most of it was used to make spiegeleisen.

The great increase in the shipments of high-grade ore from western states is noteworthy, particularly from Montana, Arizona, California, Utah and Nevada. The prices now offered are causing prospectors in these states to search closely for ores and many western mines are now shipping manganese ore that was left undisturbed in exploration years ago. The Philipsburg district, in Montana, shipped about 7000 tons a month of high-grade ore during the third quarter of 1917, and the Tombstone and Bisbee districts, in Arizona, are shipping large quantities of such ore. The rate of production of Virginia and Tennessee is increasing, but that of Arkansas and Georgia is not much larger than it was in 1916.

As recently as 1915 there was only a small market for ores containing less than 40 per cent manganese, so that the large increase in the shipment of low-grade ore in 1917 is very striking. The production of such ores now appears to be limited more by the market than by the capacity of the mines.

Recently attention has been directed to the Olympic region of Washington, where from time to time prospectors have penetrated the rugged central portions of the mountains and

Manganese Production for 1917

State	Ore containing 40 per cent of manganese or more, Jan. 1 to Oct. 1: Number of shippers	Gross tons	U. S. G. S. estimate for year (gross tons)	Ore containing 15 to 40 per cent manganese, Jan. 1 to Oct. 1: Number of shippers	Gross tons	U. S. G. S. estimate for year (gross tons)	Ore containing 5 to 15 per cent manganese, Jan. 1 to Oct. 1: Number of shippers	Gross tons	U. S. G. S. estimate for year (gross tons)
Alabama	1	90	125	..	.....	.....	..	.....	.....
Arizona	9	8,196	12,000	10	14,781	22,000	1	9,429	14,000
Arkansas	5	5,236	6,600	6	6,810	8,500	2	888	1,000
California	22	6,592	11,000	4	500	575	..	.....	.....
Colorado	..	.....	.....	*	†73,666	†96,200	†	†	†
Georgia	7	850	3,500	8	10,271	14,000	3	749	1,100
Michigan	..	.....	.....	1	29,866	54,000	..	.....	.....
Minnesota	..	.....	.....	6	209,421	253,000	5	244,400	347,000
Montana	15	33,859	60,000	7	9,171	11,000	..	.....	.....
Nevada	1	875	2,500	1	125	125	†1	†86,576	†120,000
New Mexico	3	523	1,490	2	15,235	21,500	..	.....	.....
North Carolina	1	32	60	..	.....	.....	..	.....	.....
South Carolina	1	300	500	1	200	1,000	..	.....	.....
Tennessee	5	1,923	4,400	2	175	400	..	.....	.....
Texas	1	25	100	1	110	500	..	.....	.....
Utah	5	2,820	4,000	1	100	800	..	.....	.....
Virginia	12	8,904	16,000	8	9,738	13,000	2	516	600
Wisconsin	..	.....	.....	..	.....	.....	1	168,456	190,000
	88	70,225	122,275	‡58	†380,169	†496,600	†14	†424,438	†553,700

*Not ascertained.
†Ore from Colorado and Nevada used as flux not included in totals.
‡Not including number of shippers of ore from Leadville to Pueblo, Colo., for manufacture of spiegeleisen, nor number of shippers of Leadville ore used as flux.

have found here and there some valuable metals. Considerable native copper which generally carries manganese has been located.

An examination in part of the manganese-bearing rocks in this region was made in September, 1917, by J. T. Pardee of the geological survey. Manganese-bearing lodes were found in a belt, 2 or 3 miles wide, that lies on the south and east flanks of the Olympic mountains and extends from a point south of Lake Queniault to the head of the Dungeness river, a distance of 50 miles. In addition a few similar lodes were found about 75 miles farther northeast, on the opposite side of Puget sound, near Anacortes.

Some ore that contains 40 per cent or more of manganese is found, but the bulk of the deposits is of rather low grade. Analyses show that the general run of the ore contains 26 to 35 per cent of silica, 17 to 36 per cent of manganese and 8 to 15 per cent of iron. Some of the analyses show considerable lime also, and at places in the manganiferous belt thin beds of limestone, deep red with iron oxides, are associated with the greenstone.

At their outcrops most of the manganiferous bodies range from 2 to 10 feet in width and from 50 to several hundred feet in length but the few that have been developed pinch out within 40 to 50 feet of the surface. Close estimates of the quantity of ore available are difficult to make, but probably 50,000 to 100,000 tons of ore of composition similar to that shown by the analyses mentioned lie within a few feet of the surface.

During the field season of 1917 geologists of the United States geological survey and of the Virginia geological survey have been studying the relations of the manganese deposits to the rocks and surface features in the Shenandoah valley and have come to some definite conclusions which they believe will aid in the discovery of more of the ore which is so greatly needed in the iron industry due to the war limitation of imports. A report prepared by D. F. Hewett, G. W. Stose, F. J. Katz and H. D. Miser of the survey not only describes the rocks with which the manganese ore is associated and several well known types of manganese deposits in the Shenandoah valley, but gives a brief account of six promising tracts along the west front of the Blue Ridge. This report is now being printed. Conditions in the six Blue Ridge tracts appear favorable for the accumulation of ores of manganese and manganiferous iron, and the report recommends prospecting in them with a view to the discovery of workable deposits.

South American Production

Production of manganese in Brazil and India, the two great foreign sources of supply for the United States, continues to grow. This is graphically shown in a report by Consul General Alfred L. Moreau Gottschalk from Rio de Janeiro, Brazil, and by an almost steady increase of tonnage shipped over the Central railroad of Brazil from the mines to tidewater. This ore has been taken from a manganese field served by this railroad, along a 300-mile stretch of single-track line in the state of Minas Geraes. Only recently has the mineral been discovered in the northern state of Bahia, where development still is in its infancy. While the railroad upon which the North American market chiefly depends has been handicapped somewhat by lack of rolling stock, it has managed to open operations so as to show a gratifying monthly increase. In metric tons, the movement of manganese ore over its lines during the past four years, has been as follows:

Months	1914 Tons	1915 Tons	1916 Tons	1917 Tons
Jan.	26,468	26,735	36,025	39,843
Feb.	17,510	22,915	32,780	37,505
Mar.	20,510	24,587	31,441	40,700
Apr.	16,172	24,690	34,675	46,659
May	21,058	25,138	29,400	38,747
June	26,785	20,295	37,040	51,037
July	22,720	19,060	40,394	39,158
Aug.	14,960	21,100	40,639	58,758
Sep.	12,450	28,330	36,338	45,059
Oct.	21,075	30,370	40,099	60,188
Nov.	19,620	30,635	35,940	.....
Dec.	25,857	36,025	37,654	.....
Total ...	245,185	309,880	432,425	457,654

In Mysore, India, a better grade of ore is being produced owing to further exploitation and deeper mining. Kumsi and Shankargudda in the Shimoga district are the principal sources of supply and instead of running 30 per cent the ore now obtained is running 45 to 46 per cent manganese, which costs from 12 to 15 rupees per ton ($3.84 to $4.80) f.o.b. Marmagoa.

The Engineers of Tomorrow

BY J. A. L. WADDELL

THERE is an imminent matter of vital importance to the American nation concerning which very little, if anything, has been said in the newspapers. I refer to the depletion of the classes in technical schools, first, by widespread volunteering for the army and navy, and, second, by conscription. This subject received much attention at the recent Washington meeting of the Society for the Promotion of Engineering Education, an organization of 25 years' standing and composed of most of the leading American instructors in all lines of applied science, and also a few prominent practicing engineers. The meeting was addressed by such distinguished men as the secretary of war, the chief of engineers of the U. S. army, and the director of the bureau of standards. The five sessions held by the society on those two days were devoted almost exclusively to questions of public welfare, principally connected with the war.

As I attended all of the sessions from start to finish and took the deepest interest in the entire proceedings, I feel justified in making the following statements, and in claiming that they express the opinions of a number of the most profound thinkers of America.

First—The larger part of the civilized world will have to be reconstructed after the war, not excluding our own great railroad system, which undoubtedly will have deteriorated on account of over-use and lack of adequate upkeep.

Second—Such reconstruction is almost exclusively the work of engineers.

Third—The European technical men have been killed off by thousands during the past three years; and their slaughter will not cease until the war ends. Moreover, it is more than probable that many American engineers who serve in Europe will never return to our shores, and that a large number of those who do come back will be more or less incapacitated from active professional work.

Fourth—The technical schools of all the other warring countries than ours have practically been out of commission for three years, thus cutting down there, almost to zero, the supply of new men for the engineering profession.

Fifth—The call to arms in this country by both volunteering and conscription it is feared will soon have reduced to about one-half the attendance at the technical schools of the United States, *while instead of being halved it ought properly to be doubled.*

Sixth—In spite of the present paraly-

zation of many lines of engineering work, due to the cessation of large constructions and to the absolute lack of capital for important new projects of a peaceful character, the demand for young graduates of technical schools by the manufacturers of war supplies is so great that there is already a marked dearth of such assistance, which dearth will be more and more accentuated as the war progresses, and as the call for ships, guns, ammunition, aeroplanes, automobiles, and other war paraphernalia increases.

Seventh—Until the United States entered the war, it was almost certain that most of the reconstruction work of the world would be done by American engineers, and in any case they are sure to get a fair share of it; but it seems a shame that this country should miss such a golden opportunity as that which lies before it for securing the lion's share.

Eighth—The capacity of the old, experienced, and well-established American engineers for doing work is practically unlimited, *provided that there be no shortage of young, properly-educated assistants;* because most technical men of mature years have developed highly the faculty of management. On that account the average total annual amount of work engineered by such men in this country could readily be increased five fold, or, possibly even ten fold, without causing undue overstress either physical or mental; and, consequently, the great mass of the work of world-reconstruction could emanate from the United States and be handled abroad by American engineers.

Ninth—It is beyond question that, for the next 10 years or more, engineering is everywhere going to be the most lucrative of all the professions.

What Deduction is to be Drawn?

From these nine premises what is the most important deduction to be drawn? Evidently it is that, by some means or other, we must manage not only to prevent any falling off in the attendance at our technical schools both during and directly after the war, but also greatly to increase it. And how can this be done?

The answer to this question is not difficult. It is as follows:

First.—By urging more young men to go to college, and by persuading their parents that it is their duty to send the boys there for the ultimate good of both themselves and the country.

Second.—By inducing all sub-freshmen who have shown any special aptitude for mathematics, mechanics, or chemistry, to take the technical courses.

Third.—By discouraging the enlistment into the army and navy of all students in technical institutions, but, on the contrary, by encouraging them to remain and graduate, if possible. Of course, those who are drafted will have to serve; for it would, manifestly, be unfair to the rest of the youths of the country to excuse a man from going to the front simply because he is a technical student. Such drafted students, however, should generally be sent to the engineer corps, because their services in that branch of the army would probably be more effective than in any other, and because the training they would receive therein would be likely to serve them in good stead in after years when practicing in the engineering profession.

Fourth.—By granting government aid to those youths of evident special ability in technical lines who are unable to raise the money necessary for a course of instruction.

If these four steps be taken, the unique opportunity referred to will not be lost; and this country will then become the leader of the world in activity, effectiveness, and wealth.

An Appeal to Young Men

Let me, therefore, most earnestly implore all youths who are ready for college this fall, and who are not in any way unfitted for technical careers, to take up some branch of engineering or technology; and let me entreat the parents or guardians of such youths to exert their influence so as to induce the boys to choose that line of study for their life work. Remember: it is not only for the good of the country that I make this appeal, but also for the ultimate benefit of the young men themselves!

Some reader of this communication may remark that such an appeal would possess more force if it were to come from a national engineering society than when emanating from an individual engineer. Very true! But until quite lately there has been no engineering society which draws its membership from all lines of technical activity; and the one which is now being formed, viz., the American Academy of Engineers, has not yet received from congress the national charter for which it has applied. Were that association today fully organized and duly recognized by the government, it assuredly would make such an appeal as this and, in my opinion, that appeal would immediately be responded to by the nation, for the American people certainly are sensible enough to heed seriously any words of warning coming from a select body of the most practical men in the land.

The Belmont Iron Works, Philadelphia, has issued an attractive calendar for 1918, illustrating their product.

Mining Engineers Meeting

A tentative program has been announced for the annual meeting of the American Institute of Mining Engineers which will be held in New York, Feb. 18-21. A patriotic war smoker, which is scheduled for Monday night indicates the tone which the meeting will take. Technical sessions will be held twice a day during the meeting except Thursday. On Thursday the members will visit the physical laboratory at Princeton, N. J. This excursion will also give them the opportunity of observing officers of the United States aviation corps in action.

A study of war problems will naturally occupy a prominent place on the program. A new and particularly interesting feature of the meeting will be a technical session devoted to the subjects of personnel and welfare work, for which a number of excellent papers are in readiness. A paper of timely interest entitled "The Erosion of Guns" will be contributed by Prof. H. M. Howe. A "Hoover" dinner at the Hotel Biltmore, to be attended by the members, their guests and ladies, will take the place of the annual banquet.

Book Review

Kinematics of Machinery, by Arthur Warner Klein; cloth; 227 pages, 6 x 9 inches; published by the McGraw-Hill Book Co., and furnished by THE IRON TRADE REVIEW for $2.50 net.

"Kinematics of Machinery" is a text book covering the problems which have arisen in connection with recent developments of mechanisms and the consequent varying phases of their motions. An example of this is the comparatively recent growth of high-speed machinery and the many interesting questions to which it has given rise.

The volume in hand solves these problems by relatively simple graphical methods. These replace the usual complex analytical solutions with their approximations and consequent lack of clarity.

The main part of the text occupies itself with the equivalence, displacement, velocities and accelerations of mechanisms and gives the necessary preliminaries in the way of auxiliary construction and theorems with applications to many practical problems; here the velocities and accelerations are mainly treated by the method of centers. In Appendix B velocities and accelerations are found by the method of polygons. The subject is discussed in a thorough fashion so as to meet the demands of the most advanced practice.

For Increased Sintering Capacity

Larger Grate Surface, Positive Return, Sealed Pallet Boxes, and Decreased Friction Are Attained in an Improved Sintering Machine—A Development of the Dwight and Lloyd Design

AN IMPROVED Dwight & Lloyd sintering machine shown in the accompanying illustrations, was recently completed for the Carnegie Steel Co. at New Castle, Pa., for sintering blast furnace flue dust. This new machine has an active grate surface 42 inches wide and 57 feet 4 inches long, and its sintering capacity is said to be 2¼ times that of the present standard Dwight & Lloyd machines. It contains a number of improvements which are the result of experience gained by the American Ore Reclamation Co., New York, in the operation of the many standard Dwight & Lloyd sintering machines which have been installed in the last six years.

The standard Dwight & Lloyd machine heretofore used has an active grate surface 42 inches wide 25 feet 6 inches long and the lower strand of pallets rolls by gravity along an inclined track back to the driving sprocket wheels. The greater length of the new machine makes the use of a gravity return undesirable and the lower strand of pallets, therefore, is positively driven along the lower track by sprocket wheels at the discharge end, as shown in Fig. 2. The discharge and sprocket wheels are driven in synchronism with the driving and sprocket wheels, as shown in Fig. 1. This synchronous drive insures the return of the empty pallets to the driving sprocket wheels at the same rate of speed as that of the pallets on the upper strand.

On this new large machine, sliding friction between the pallets and the wind box tops is eliminated by carrying the weight of the loaded pallets on wheels running on rails. The pallet wheels are fitted with renewable steel bushings and have large oil spaces that carry a month's supply of grease. The sprocket wheel teeth drive against tooth surfaces cast in the frame of the pallet and not against the pallet wheels, thus allowing the pallet wheels properly to perform their function of rolling around the curved tracks at the drive end.

All of the gears and the sprocket wheel teeth on the new machine are steel castings. All gears and the shaft couplings are wholly enclosed in heavy sheet steel housings. The sprocket-wheel teeth are removable and are machined in jigs so that they are interchangeable and when worn may be replaced without tearing down the larger members of the drive. The driving pulley is fitted with a cast-iron break pin to prevent any accidental injuries to the driving mechanism.

An important feature of the new machine is the use of seal bars on the pallets which automatically maintain air-tight joints between the pallets and the tops of the wind boxes. These seal bars are made light and by their own weight bear on the finished surfaces of the wind box tops and also fit against the finished sides of the pallet slots where the bars hang.

The first one of the new machines was tested under full load conditions which were obtained by loading the upper strand of pallets with 20 tons of pig iron. In the tests it is stated the machine ran smoothly and the seal bars made a tight joint. The horsepower readings taken during the tests show that the various improvements have been effective in reducing the driving load. The fully loaded machine as set up for the test required 12¾ horsepower.

Based on the performance of the smaller machines now in service, the capacity of the new large machine will approximate the following amounts: Flue dust, from 300 to 350 tons sinter per day of 24 hours; pyrites cinder, from 375 to 450 tons sinter per day of 24 hours, and magnetic concentrates, from 450 to 550 tons sinter per day of 24 hours.

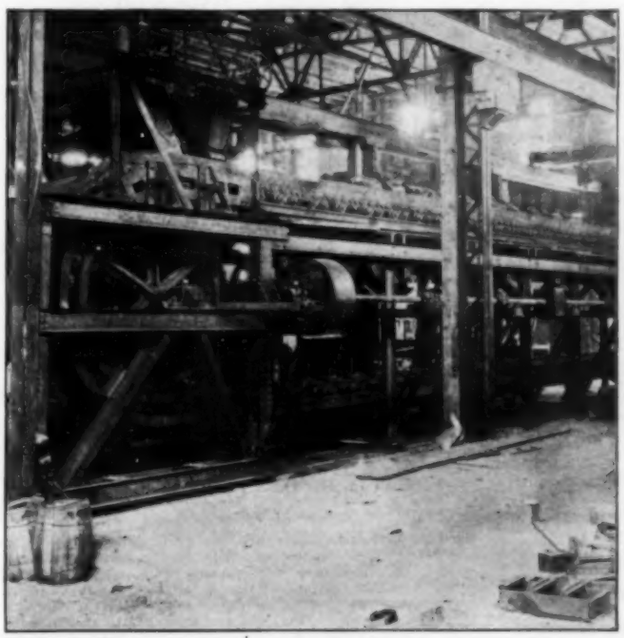


FIG. 1—GENERAL VIEW OF IMPROVED, EXTRA HEAVY SINTERING MACHINE

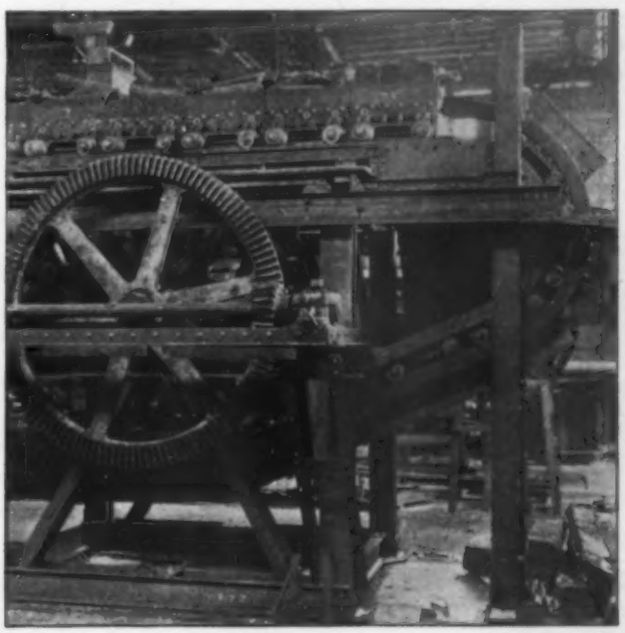


FIG. 2—SPROCKET WHEELS DRIVING THE LOWER STRAND OF PALLETS AT THE DISCHARGE END

How You May Sell to Uncle Sam

A Complete Official List of Purchasing Officers for the Government, Connected With the Business of War—Whom to See and Where to See Them in Washington

THE government and the man with something to sell are working toward the same end. Speed is their mutual aim. The chief problem is to get the man with something to sell in touch with the man who has the authority to buy. With the tremendous expansion of all governmental functions to handle the business of a huge war, within a few months' period has come great and inevitable confusion. New bureaus have been created, departments have been reorganized and greatly extended and the parcelling of duties and authority has proceeded throughout the various branches of the government on a comprehensive scale. Loss of much valuable time has resulted from the very bigness and newness of the war organization. Those who went to Washington to offer their plans, their services or their products, found difficulty in locating someone with whom they could negotiate.

To aid in obviating this difficulty, and to increase and facilitate negotiations THE IRON TRADE REVIEW presents herewith the official list of purchasing officers of the government's war machine and the products for which each has the authority to place orders.

Emergency Fleet Corporation

For Purchase of:	Persons to be Consulted
Boilers and machinery (other than electrical machinery).	A. L. Bell
Electrical apparatus and machinery	W. R. McCann
Anchor chain, wire rope, hemp rope, nautical instruments, miscellaneous equipment and supplies	J. P. Bourke
Raw and semi-finished material on which government expects to have prices fixed	G. R. Jasper
Lumber—southern pine and Oregon fir	F. K. Pawcett
Lumber—hardwoods	F. K. Paxton

Inspection:	Persons to be Consulted
(For material purchased by purchasing department only)	E. A. Rebbeka
Contracts and specifications.	T. D. Adams
Chief clerk	J. Birnie

War Department

OFFICE OF CHIEF OF ORDNANCE

Carriage Division

Lieutenant Colonel J. H. Rice, Room No. 139, State War and Navy Building.

Field Artillery Section

Lieutenant Colonel L. T. Hillman, 18th and E streets, N. W.
Field artillery material except guns and ammunition.

Seacoast Artillery Section

Major J. B. Dillard, 18th and E streets, N. W.
Seacoast material and railway materials and equipment, except guns and ammunition.

Machine Gun Section

Major E. McFarland, 1703 New York avenue.
Machine guns and automatic guns and equipment, except ammunition.

Motor Equipment Section

Major L. B. Moody, 1703 New York avenue.
All motor equipment for field artillery tractors, ammunition trucks, tanks, etc.

Anti-Aircraft Section

Major J. B. Rose, Eighteenth and E streets, New York.
All anti-aircraft mounts and equipment except motor equipment, guns and ammunition.

Equipment Division

Major J. R. Simpson, Hooe building, No. 1330 F street, N. W.

1.—Cotton and duck webbing.
2.—Cloth equipment made of cotton duck and webbing such as haversacks, pack carriers, cartridge belts, intrenching tool carriers, paulins, grain bags, feed bags, etc.
3.—Leather.
4.—Equipment made of leather, such as saddles, bridles, halters, bayonet scabbards, rifle scabbards, pistol holsters, belts, etc.
5.—Mess equipment, such as canteens, meat cans, bacon cans, knives, forks and spoons.
6.—Hardware, such as intrenching tools, picks, shovels, wire cutters, stencil outfits, marking outfits, etc. Also small hardware parts to be used in connection with cloth and leather equipment—such parts consist of snaps, hooks, buckles, eyelets, grommets, etc.
7.—Cleaning and preserving materials, such as sperm oil, neatsfoot oil, soap, sponges, ammonia, ammonium carbonate, etc.
8.—Steel helmets, including helmet linings and eye guards.
9.—Fencing equipment, including fencing plastrons, gloves, masks, wooden fencing masks, and wooden sabers.
10.–Periscopes.
11.–Woolen horse blankets.
12.–Horse covers.
13.–Instruments of precision, such as musketry rules.

Gun Division

Colonel Jay E. Hoffer, B street and Virginia avenue, N. W.

Artillery Ammunition Section

Lieutenant Colonel E. P. O'Hearn.
Artillery ammunition of all description from 3 to 16-inch in caliber.
Armor piercing projectiles.
Common steel shell.
Shrapnel.
All types of fuses.
Primers.
Fuse setters.
All accessories therefor, including paints, containers, packing boxes, etc.

Cannon Section

Major C. C. Jamison.
Cannon of all character from 3 inches to 16 inches (but this section *does not* handle small arms machine guns, carriages or mounts for cannon).
Forgings for cannon.
Breech mechanisms.
Firing mechanisms.

Explosives Section

Major J. H. Burns.
Smokeless powder for small arms and cannon.
Black powder.
High explosives of all kinds.
Raw material used in the manufacture of Powder and explosives.

Trench Warfare Section

Captain E. J. W. Ragsdale.
Hand grenades.
Chemicals used for illuminating, incendiary and asphyxiating purposes.
Rifle grenades.
Aerial bombs.
Trench mortars.

Raw Materials

Major Douglas I. McKay, Hooe building.
Materials used in manufacture of ordnance material used by this division.
Steel, copper, spelter, lead, antimony, etc.

Division "T"

Colonel J. W. Joyce, Room 209 National Savings and Trust building, No. 719 Fifteenth street.
Supplies used in the manufacture of ammonia and acids, in purifying and compressing gases.

Small Arms Division

Colonel John T. Thompson, No. 1801 I street, N. W.
Small arms rifles,
Revolvers,
Scabbards,
Bayonets,
Small arms ammunition,
Targets,
Marksmen's insignia,
Automatic pistols,
Sabers,
Bolos,
Shot guns,
Target material.

The above mentioned articles are being purchased by the small arms division only in their completed state. The components entering into the manufacture of these several articles are being procured for the several contractors furnishing supplies to this department by the purchasing contractor of small arms ammunition manufacturers, No. 50 East Forty-second street, New York City.

A list of the components purchased by that bureau follows:

Steel (Not allotted by government).	Cotton waste.
Brass rod cleaners.	Chlorate of potash.
Rivet wire.	Lead sulphocyanide.
Screw bracket butt plate.	Antimony sulphide.
Butte plates.	Tri-nitrotolunen.
Cleaners bristles.	Manganese copper.
Cord.	Chip board.
Black walnut stocks.	Packing cases.
Thong case and caps.	Deadening pelt.
Thong cord and bristle brush.	Crucibles.
Emery and emery wheels.	Bandoleers.
Carborundum wheels.	Clips.
Bortz.	Coke.
Sling straps.	Newsboard.
Scabbards.	Solder
Drills.	Charcoal.
Screw drivers.	Screw hooks and thumb nuts.
Oil.	Varnish coating.
Lard.	Iron screws No. 13 2-inch.
Mineral.	Wire nails, 8 penny.
(Not alloted by government).	Shellac.
Sulphuric acid.	Soda ash.
	Rosanaline.
	Alcohol denatured.
	Terne plate.

PURCHASES FOR SIGNAL CORPS

Aircraft Division

Old Southern Railway building

Lieut. H. H. Emmons, Motors and parts.
H. L. Shepler, Planes.
L. S. Horner, Ordnance and instruments for signal corps.
Major C. R. Sligh, Woods, etc.
Captain H. D. Moore, general equipment.

Office of Quartermaster General

No purchases are made by officers on duty in the offices of the quartermaster general but authority for making purchases is given by the various divisions to the depot quartermasters, constructing quartermasters, department and other quartermasters at various military posts and stations to purchase materials and hire labor or enter into contracts for supplies as follows:

Supplies Division
(State, War, and Navy Building)

Brigadier General A. L. Smith, Q. M. Corps.
Lieut. Col. William E. Horton.
Fuel, forage, specifications for uniforms, etc.
Lieut. Col. George H. Penrose.
Miscellaneous supplies, such as typewriters, adding machines, printing outfits, stationary, office furniture, field ranges and field ovens.

Transportation Division

Colonel G. B. Drake, Q. M. Corps.
Colonel Drake is in charge of motor transportation — automobiles, motor trucks, motorcycles, bicycles, tractors, trailers, tires, oils and greases for same; also in charge of water transportation—supplies except subsistence, in connection with the transport and harbor boat service.
Major J. S. Pair.
Remount service—wagons and parts, horse drawn ambulances, carts, saddles, harness, harness parts, stable equipment.

Captain H. A. Hageman.
Transport repair shops—machinery and equipment for repair shops being organized for service abroad.
Major C. M. Curran.
Rail transportation—all kinds of railroad equipment, repair, etc., after installing.
Major J. W. Furlow.
Engineering features of motor transportation—in connection with testing of motor trucks with the view of standardization.

Cantonment Division
(15th and M streets)

Brigadier General I. W. Littell, Q. M. Corps.
Captain R. C. Marshall Jr.
This division has charge of construction of the national guard camps and national army cantonments and of the purchase and installing of material required to complete such camps and cantonments. A chart showing the division of that office is enclosed.

Construction and Repair Division
(15th and M streets)

Major C. C. Zollers, Q. M. Corps.
Supplies in charge of this division are as follows:

Barracks, quarters, storehouses, etc.
Plumbing, heating and lighting in new buildings.
Fences.
Post bakery ovens.
Gymnasiums, bowling alleys, etc.
Shooting galleries and ranges.
Rentals, including recruiting stations and lodgings.
Permanent picket lines.
Flagstaffs.
Heavy furniture for officers' quarters.
Wall lockers.
Track and wagon scales.
Refrigerators.
Drafting and surveying instruments.
Power plants, including lighting, heating, refrigerating and pumping.
Laundries, crematories, etc.
Electric lighting systems.
Purchase of light.
Incandescent lamps.
Field laundries.
Installation of elevators.
Saw mills and saw mill equipment.
Steam cooking appliances.
Moving picture machines and equipment, including folding organs, chairs and tables.
Assembly tents for chaplains' equipment.
Wharves, sea walls and retaining walls.
Dredging.
Purchase of water.
Roads and walks.
Water-distributing systems.
Crematories, incinerators and odorless excavators.
Sewerage systems and purification plants.
Railroad rolling stock and equipment—first installation.
Drainage.
Cars and improvement of grounds.
Railway on reservations.
Time and fire-alarm systems.
Water systems.
Fire apparatus.

Cemeterial Branch

Captain H. R. Lemly.
Supplies in charge of this division are as follows: Coffins, metallic caskets, headstones.

Engineering Corps

Major Rose in charge of purchases, 1419 F street.
S. M. Pelton, No. 734 Fifteenth street.
Railway equipment and supplies.
Capt. S. D. Miller, 1419 F street.
Electric equipment.
Capt. O. M. Zimmerman, Winter building, U street.
Mechanical and miscellaneous.

Navy Department

Bureau of Ordnance

New Interior Building,
18 and F streets, N. W.,
(6th floor W. Wing).

Rear Admiral Ralph Earle, Chief of bureau, room A.
All matters of policy.
Commander T. A. Keraney, assistant, chief, room B.
Requisition for material for all yards and stations.
E. C. Bradt, Chief clerk, room C.
Office supplies.
Lieut. N. W. Pickering, room D.

Refractories

(Per 1000 f. o. b. works.)

FIRE CLAY BRICK.
(First Quality.)

Pennsylvania	$45.00 to 55.00
Missouri-Illinois	55.00 to 65.00
Ohio	45.00 to 50.00
Kentucky	45.00 to 55.00
New England	55.00 to 65.00

FIRE CLAY BRICK.
(Second Quality.)

Pennsylvania	$40.00 to 50.00
Ohio	35.00
New England	48.00 to 58.00

SILICA BRICK.

Pennsylvania	$50.00 to 60.00
Chicago	55.50 to 65.50
Birmingham	45.00 to 55.00

MAGNESIA BRICK.
(Per Net Ton.)

9 x 4½ x 2½ ..... $135.00 to 160.00

CHROME BRICK.
(Per Net Ton.)

9 x 4½ x 2½ ..... $135.00 to 140.00

BAUXITE BRICK.
(Per Net Ton.)

55 per cent.	$40.00 base
76 per cent.	100.00 base

Guns and breech mechanism.
Lieut. L. S. Bye, room E.
Turret mounts, recoil springs.
Lieut. C. L. Caskey, room F.
Powder and fuses.
Commander T. V. Ogan, room G.
Torpedoes.
Lieut. Commander R. S. Holmes, room H.
Armor and projectiles.
Lieut. Commander W. T. Lightle, room I.
Supplies (ships).
Rear Admiral R. R. Ingersoll, room K.
Inventions.
Lieut. Commander W. E. VanQuken, room L.
Fire-control optical instruments, range-finders, binoculars.
Lieut. Commander S. C. Rowan, room M.
Mounts, (other than turret), and small arms.
Commander S. P. Fullinwider, room N.
Mines and mining, wire ropes.
Rear Admiral N. E. Mason, room O.
Member of Priority Board.
Commander F. H. Clark, room P.
Armor and projectile plant to be constructed at Charleston, W. Va.
Lieut. T. S. Wilkinson, room Q.
Experiments.
Commander A. L. Norton, room R.
General inspector.

Bureau of Supplies and Accounts
State, War and Navy Building.

Purchases all miscellaneous supplies and equipment for the Navy. Consult Paymaster Fisk.

Bureau of Yards and Docks
Navy Annex, New York Ave.
In charge of contracts for Navy construction.

Better Shipments

Being Made in Refractories Than in Many Other Lines

Shipments of refractories average about 70 per cent on contracts. The industry is doing better in this direction than many other lines of activity because it is on the preferred list. It is, however suffering by reason of embargoes which are holding it back on deliveries of a purely domestic character. Fair success is also being met with by refractories interests in obtaining coal as considerable improvement has developed recently. Some of the fuel is of an inferior quality, which is having an unfavorable effect on production.

The car shortage affecting a number of Ohio makers of fire brick has become so acute that it will force these plants to be shut down unless a decided improvement is immediately made. A representative maker whose normal requirements involve 10 cars daily, received only two cars during the period from Dec. 22 to Dec. 31; similarly during the period from Jan. 1 to Jan. 14 only two cars were received. In December 30 cars were received at the plant, 15 of which were delivered in two days. With a four-months' output of brick stacked at the plant and fully 200 cars required to fill existing orders, the seriousness of the situation is apparent. Priority orders have been unavailing in stimulating car movement. This case is representative of conditions in general among makers of fire brick.

Foundry Equipment Needed

Bids will be opened by the bureau of supplies and accounts, navy department, Washington, on Jan. 28, covering foundry equipment for delivery at Norfolk, Va. This equipment is embodied in schedule 2732½ and includes the following items: One motor-driven blower; one single grab bucket; 50 3-ton charging cars; 20 500-pound charging cars; four 4-ton transfer cars; miscellaneous foundry equipment; one lifting magnet; eight turntables; four track scales; lining and installing equipment.

The Adrian Steel Casting Co., Adrian, Mich., has ceased to make steel castings. Gray iron castings only will be produced until further notice.

Navy Will Restore Steel Bidding

Lower Quotations Sought by Bureau of Supplies and Accounts Particularly on Mill Material Not Definitely Fixed as to Price by Presidential Announcement —May Extend Even to List Under Maximum Agreement

WASHINGTON, Jan. 15.—Lower steel quotations on government orders through resumption of competitive bidding may come from a decision made last week by Rear Admiral Samuel McGowan, chief of the bureau of supplies and accounts, navy department, to purchase certain steel materials direct from the trade without allocating the order through J. Leonard Replogle, director of steel supply, of the war industries board. This decision is seen as a forerunner of lower quotations and is a new factor in the price adjustment program which now prohibits the making of new contracts for longer than the current quarter at present prices.

Prices May Go Down

All the prices announced by the President after representative steelmakers agreed the trade should abide by them, are maximum prices and, of course, do not prevent orders being taken at lower levels. How far this will be done depends entirely upon how far mill capacities are booked and, in the face of curtailed profits and heavy war taxes, upon the willingness of manufacturers to accept business at figures lower than those now in effect.

In view of Admiral McGowan's decision, it is evident that sworn government purchasing officers who, in the last analysis are responsible for their respective contracts, no matter by whom allocated, have determined they are not fully exercising their functions in merely accepting the President's prices. It is clear they feel they should place contracts at as low a figure as possible and may be expected to go as far as they can in this direction.

Not in Fixed List

"In sending these requests for bids to you, your attention is respectfully invited to the fact that the prices for the articles contained in the schedule mentioned above have not been fixed by the President and therefore the articles cannot be allocated by the director of steel supply," says Rear Admiral McGowan in his letter to steelmakers calling for bids on certain requirements for 1918 delivery. The material sought is of a character not contained in the President's three announcements fixing maximum prices.

To this end it is expected competitive bidding will be resorted to as far as practicable. This may extend even to the articles on which the President has announced prices, although Admiral McGowan's letter to manufacturers says, for that particular inquiry, that the tonnage sought is not one in which the President named the quotations. It is indicative, however, of what may come.

The intimation has been given here that the industry, while selling under agreed prices at profits considerably lower than formerly had been realized, will welcome the chance to put some life into an otherwise stagnated trade. This latter condition lately, is attributed chiefly to the imposing upon the manufacturers of the restriction as to length of contracts at present prices.

Pomerene Bill in Doubt

Senator Pomerene is still in hope of having his bill considered in congress in time to have the government control the industry before the end of the present quarter, but in view of the pending railroad bill, it is a matter of conjecture when the steel bill will be given committee attention as both measures are before the same group of senators. In the face of the new possibility of obtaining lower prices on individual contracts, depending upon the ability of the purchasing officers to develop such quotations, there is some doubt of immediate consideration of the Pomerene bill. It has been stated repeatedly that while the prices only are agreed ones, the government exercises such control of priority, commandeering power, etc., that the Pomerene bill is wholly unnecessary.

War Board May Pass Without Ministry

WASHINGTON, Jan. 15.—The navy department's bureau of supplies and accounts has broken away from the steel distribution system of the war industries board. This action, while not wholly abandoning the steel division, indicates less attention will be paid the civilian organization and that the efficiency of the navy's system may become the general plan of other government buying departments. First evidence of the real break came last week when the bureau, under direction of its chief, Rear Admiral Samuel McGowan, sent out letters to steel manufacturers inviting them to bid on certain steel requirements for 1918.

The decision of the bureau to go its own way in making steel purchases other than on those articles named in the three price announcements of the President and reaffirmed in the statement of Dec. 28, last, which also limited contracts at present prices to April 1, was reached after full legal consideration of the facts. This confirmed the point that, despite all price arrangements and supply advices of civilians, sworn government officers must make all purchases and be responsible for them.

The laws already on the books require that bids be invited on all orders, whether for steel or other commodities, except possibly in cases of real emergency when the judgment of the purchasing officers must guide them in the course which, despite the emergency, still comes under the strictest interpretation of responsibility. It was the emergency growing out of the war with Germany that created the old munitions board and later the war industries board which, while of assistance in some instances, developed into an unwieldy mass of red tape and established the division of steel supply. J. Leonard Replogle is director.

By eliminating negotiations with

the war industries board except for that steel on which the President actually announced the prices, the bureau of supplies and accounts goes back to the system of advertising and inviting bids on contracts. It is the system of publicity which has been built up by Admiral McGowan that sent the navy through the bevy of congressional inquiries without drawing the criticism similar to that heaped on the army which, in the main, relied on the war industries board for its supplies. The navy is going to stand on its own feet as far as possible.

With the President in open disfavor of a ministry of munitions and with the war department steeped in the mire of congressional probes, it is altogether likely that the department's ordnance and quartermaster's bureaus will be thoroughly reorganized along business lines and that many of Admiral McGowan's efficient and effective methods will be adopted. Secretary Baker is now engaged in some sort of revamping his department which more than likely will further eliminate and eventually abandon the war industries board.

May Reorganize War Board

This indicates that at a not far distant date the war board, recently recast with a series of divisions and directors in charge, each more or less assuming purchasing powers, will again be reorganized, but this time for purely advisory purposes. The army, the navy and the shipping board, the three big national consumers, demand the same general things but each in widely divergent ways. That one central board cannot meet these demands has been demonstrated and it will be only a matter of time until each department wakes up to its own full responsibility. As a naval officer recently said:

"The navy and the army are the two war arms of the government and each, in time, will get back to the system of supplying its own needs. There won't be any ministry of munitions and the war board will lose what semblance of power it may have and become merely a board of advisors. The navy has its own system. The army will develop one."

The steel articles on which the President approved the agreed prices are: Ore, coke, pig iron, steel bars, shapes, plates, blooms and billets, slabs, sheet bars, wire rods, shell bars, skelp, sheets, pipe, cold rolled steel, scrap, wire and tin plate. On all other articles the bureau of supplies and accounts will exercise its own pricefixing function, that of satisfying itself on prices obtained through direct bidding.

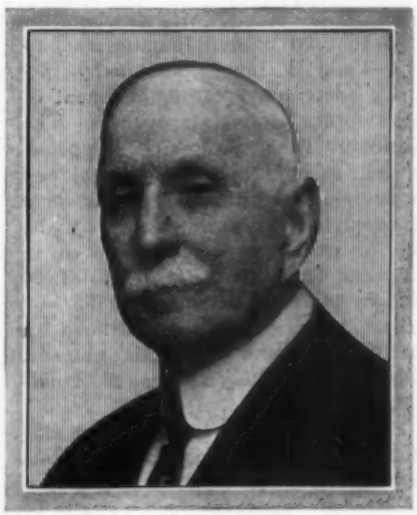
Must Obtain Licenses in Ammonium Sulphate

Washington, Jan. 15.—The legal department of the license division of the food administration has begun the licensing of "all persons, firms, corporations and associations engaged in the business of importing, manufacturing, storing or distributing ammonia, ammoniacal liquors or ammonium sulphate" under proclamation issued by the President, Jan. 3. License must be obtained by Jan. 21 if penalties provided in the food and fuel bill are not to be inflicted.

The decision of the President to control this industry is because of the shortage of ammonia and ammonia products for the government's chemical requirements in connection with the manufacture of munitions. Secretary Houston of the agricultural department has been put in charge of the industry with a special committee to assist in the administration.

Obituaries

CHRISTOPHER W. LEVALLEY, founder and chairman of the board of directors of the Chain Belt Co., Milwaukee, died suddenly of heart failure at his home in that city, Jan. 4. He would have been 83 years of age had he lived until April. Born at Manchester, Conn., in 1835, he moved to Hartford, Conn., 14 years later and served an apprenticeship in a machine shop. After serving in the civil war, he located in St. Paul, and was made superintendent of the St. Paul Harvester Co. At this time, Mr. Levalley saw the necessity of a positive drive for harvesting machinery and in 1891 he established the Chain Belt Co., in Milwaukee. It was his idea to drive a concrete mixer with a steel chain, using a cast semisteel drum. He was the company's president and general manager from 1891 until 1916, when he was elected chairman of the board of directors and this office was held by him until his death. He was interested also in the C. O. Bartlett & Snow Co., Cleveland, and in the Federal Malleable Co., Milwaukee. Many charitable institutions were recipients of his gifts and in 1917 he donated $100,000 to the Milwaukee foundation.



CHRISTOPHER W. LEVALLEY

Thomas R. Tobin, age 36, superintendent of the Warren Steel Casting Co., St. Louis, Mo., died recently of pneumonia.

Henry Belin Jr., president of the Wyoming Shovel Works, Wyoming, Pa., died at his home in that city, recently.

John Booth, who engaged in the wire and iron manufacturing business in Chicago from 1866 to 1909, died there Jan. 10 at the age of 84. He was born in Manchester, Eng., in 1833, and came to Chicago in 1856.

Albert Clark Case, at one time a partner of Andrew Carnegie in the Carnegie Steel Co., died at New York, Jan. 10, aged 66. He was president of the American Cotton Co. In his youth he became a telegrapher for the Pennsylvania railroad and in 1886 he served as auditor of the Baltimore & Ohio Telegraph Co. He subsequently acted as credit agent of the Carnegie company and became a partner in 1899.

Charles J. Klein, inventor of electric push button mechanisms, affiliated with the Cutler-Hammer Mfg. Co., Milwaukee, since 1908, died at his home in that city recently, following a stroke of apoplexy. He was born in New York City 55 years ago and became connected with the electrical industry in its early stages, having been affiliated with Edison in the installation of the first electric station in New York City.

Plan Nation-Wide Labor Exchange

Department of Labor Undertakes Comprehensive Union of Federal, State and Municipal Facilities to Recruit and Distribute Employes for Shipbuilding, Munition Making and Other Essential War Demands—Believes Supply Ample

TO MOBILIZE over 3,000,000 workers for agriculture, shipbuilding and munition plants is the task taken over by the United States employment service of the department of labor. This plan has the approval of President Wilson and he has requested the secretary of labor to undertake its administration. When the employment service was recently disassociated from the bureau of immigration, Secretary of Labor Wilson appointed John B. Densmore, of Montana, who was solicitor for the department of labor, national director. His assistants are Charles T. Clayton, of Maryland, and Robert Watson, of Massachusetts.

Tremendous expansion is contemplated for this movement and existing as well as projected federal, state and municipal employment offices will be utilized. These together with the labor supplying facilities of the various state councils of national defense will enable the federal employment service to cover the entire continent with a network of inter-related labor exchanges. Already more than 200 such exchanges are in operation and the immediate establishment of 50 more is projected. Workers will be recruited and transferred from one section to another as industrial demands dictate and it is hoped by the officers that not only the present demand will be supplied but a reserve created to meet the increasing demands of various war industries.

Five Divisions Planned

The employment service will be aided by its two auxiliary bodies, the United States public service reserve and the United States boy's working reserve. The following five divisions will handle the detail work: Information, farm service, women workers, reserves and investigation. The present available labor power of the United States is estimated at 29,650,000 men plus 8,875,000 women and 1,700,000 set aside for the national army. This has inspired Secretary of Labor Wilson to state his belief that there is an ample labor supply in the country both for the army and for industry, and that conscription will be unnecessary. He estimates that the first year of the war will demand only 3 per cent of the available working men since the problem to him is merely one of proper adjustment.

More Women Are Taking Up Industrial Work

If Lewis T. Bryant, commissioner of the New Jersey department of labor, has his way, the 10-hour workday for men will be changed to eight, since so many women are taking men's places in New Jersey industrial establishments. He made this suggestion to Governor Edge in his annual report recently. In Bloomfield, N. J., the International Arms & Fuse Co., Inc., is employing 25 girls on lathe work and the number will be increased. The force of female workers in the northwestern mills of the Carpenter Steel Works, Reading, Pa., performing laboring tasks will soon be increased from 20 to 150. Fifty other girls are employed in the office. For the first time in its history, the Draper Corp., Hopedale, Mass., manufacturer of looms, will employ 100 girls to tend light automatic machinery, while in Lorain, O., many factories contemplate the employment of large forces of women workers. The National Tube Co., it is reported, intends to employ many women, and in many other directions, female help is supplying the need created by the call of war for men. This need in England has been met by 1,421,000 women being employed since the war began, making the total women in industry 4,766,000. Of this number, 670,000 are working to produce munitions.

Three companies manufacturing ammunition in Massachusetts have notified the state free employment offices in Boston that they will require a large number of women in the near future and women have been put to work at lathes in the machine shop of the Erie railroad shops at Marion, O.

Employers of female help in Pennsylvania have had sent them by the Pennsylvania State Industrial board, a questionnaire, to ascertain what steps have been taken to place women in work formerly done by men. The survey will develop what medical examinations are given, what welfare work has been arranged, whether shorter hours are given to the women than were given the men, whether the women get the same wage as men for the same work, etc.

The labor and woman's committees of the Ohio national defense council have gone on record as opposing the substitution of women for men. A canvass is now being made to ascertain how many women are entering the industrial field and of the conditions under which they are working. S. P. Bush, president of the Buckeye Steel Castings Co., Columbus, O., asserted that he believed only a vital necessity such as might be brought to the nation's attention by the President, should lift the labor restrictions.

Mill Workers Advanced

Wages for sheet mill and tinplate operatives for the 2-month period commencing Jan. 1 advanced 4½ and 5 per cent respectively, as a result of the bimonthly settlement between the Amalgamated Association of Iron Steel and Tin Workers and the Western Sheet and Tinplate Manufacturers' association in Youngstown, O., recently. Sheet mill workers have been advanced 81 per cent since Jan. 1, 1917, while tinplate operatives have been advanced 87 per cent in that time. On the present basis of wages, rollers working steadily should be able to earn nearly $1000 a month.

Employers' Saving Large

A bulletin has been issued which gives a comprehensive survey of the workmen's compensation insurance field in the country. Statements contained in it of the Ohio industrial commission show that since the Ohio state insurance plan was adopted in July, 1911, $8,186,942.30 has been saved the employers of the state who are subscribers. That is the difference between the cost of the state plan and the sum those subscribers would have paid the liability companies had they purchased from them the insurance carried. For the year 1917, $5,000,000 was the minimum saving. The bulletin states further that if the Ohio plan was general throughout the country it is estimated that the annual saving to the employers of the nation would be $23,400,000.

Exports Drop Off Sharply

November Total Smallest Month in Outbound Iron and Steel Shipments Since July—Semifinished Total Large

EXPORTS of iron and steel products from the United States during the month of November showed a decided falling off from the large total recorded in October. Advance figures issued by the bureau of foreign and domestic commerce indicate that the movement in November amounted to only 473,459 tons, or approximately 85,000 tons less than the October total of 557,138 tons, and 80,670 tons less than November, 1916, when the shipments amounted to 554,219 tons. The November movement was the smallest since last July.

Pig iron exports showed an exceptional decline in November. Total shipments for that month were only 25,733 tons, compared with 47,200 tons for October and 106,781 tons for November, 1916. This is the smallest total reported since April, 1916. Many other products show a loss in tonnage, of which the most notable are steel rails, steel bars, scrap and structural iron and steel.

Exports of steel ingots, billets and blooms for November were 150,120 tons. While this total was not as large as that for October, 204,724 tons, it showed a decided increase over the November, 1916, total of 120,883 tons. Sheet and plate exports were at practically the same rate in November as in the preceding month, the figures being 64,425 tons and 65,761 tons, respectively. For the 11-month period ending with November, however, 1917 exports of sheets and plates amounted to 764,555 tons, compared with 465,359 tons for the same period in 1916.

Exports of iron and steel products for the month of November were valued at $97,970,114. This is $16,226,629 less than the October figure of $114,196,743, but shows an increase over the November, 1916, valuation which amounted to $77,834,139. For the 11-month period ending with November, the 1917 figure was $1,123,603,635, compared with $728,451,202 for a similar period in 1916.

IRON AND STEEL EXPORTS.
Gross Tons.

	November		Eleven months ending November	
	1917	1916	1917	1916
Scrap	7,081	19,559	149,423	197,905
Pig iron	25,733	106,781	588,712	502,041
Steel billets, ingots and blooms	150,120	120,883	1,827,484	1,341,661
Wire rods	19,062	12,552	161,213	144,966
Steel rails	39,250	55,501	461,703	499,703
Steel bars	30,344	57,819	547,884	711,152
Iron bars	5,028	4,040	49,412	67,727
Struc. iron and steel	19,179	27,735	262,401	264,946
Hoops, bands and scroll	4,200	3,548	51,532	40,168
Sh'ts and plates	64,425	45,382	764,555	465,359
Tin and terne plate	21,176	15,816	209,280	209,157
Barbed wire	27,977	23,528	177,491	403,054
All oth. wire	20,698	18,955	184,369	249,653
Cut nails	571	326	3,911	4,529
Wire nails	10,053	11,247	98,081	139,158
All oth. nails incl. tacks	1,441	1,768	17,668	11,050
Pipes and fittings	21,782	24,800	189,074	208,648
R. R. spikes, bolts, nuts, rivets and washers	5,827	3,449	47,862	49,461
Horseshoes	503	409	7,732	7,660
Cast radiators	99	121	4,771	2,227
Total	473,549	554,219	5,804,558	5,520,225

EXPORTS, GROSS TONS.

1916	Pig iron	Semi-finished material
Jan.	19,319	55,315
Feb.	15,061	87,406
Mar.	19,439	107,674
Apr.	18,518	88,764
May	28,293	142,782
June	48,770	116,316
July	28,718	135,827
Aug.	60,264	160,921
Sep.	64,132	163,104
Oct.	92,756	162,669
Nov.	106,781	120,883
Dec.	105,195	162,961
1917		
Jan.	69,146	183,636
Feb.	49,018	131,566
Mar.	69,629	193,469
Apr.	44,783	162,209
May	61,112	168,158
June	81,999	192,133
July	32,368	112,085
Aug.	62,083	189,083
Sep.	44,287	148,932
Oct.	47,200	204,724
Nov.	25,733	150,120

Establish First Plant to Make Silicomanganese

Silicomanganese for the first time is being made in this country for the general market. The Pacific Electro Metals Co. has established a plant at Bay Point, San Francisco, and completed the installation of electrical furnaces capable of producing about 1000 tons of silicomanganese and ferromanganese per month. The plant was placed in operation about Jan. 1 and shipments on contracts already made will begin to go forward shortly. The output will be varied in accordance with demand. It now is considered that 78 to 82 per cent ferromanganese will constitute only a limited portion of the production, and that the greater part of the tonnage will be silicomanganese. The grade of silicomanganese to be produced initially will contain 20 to 25 per cent silicon, 50 to 55 per cent manganese, about 1 per cent carbon and the remainder iron. Later a higher grade will be made. In order to render itself immune from the scarcity of electrodes, the company has built its own plant for the making of electrodes, thus insuring continuous operation of its electric furnaces. The supply of ore controlled by the company is obtained from points in California and other western states, and is of a character specially suited to the economical production of silicomanganese. Up to the outbreak of the war, silicomanganese had been in regular use by a number of large steel companies in this country, but since the latter part of 1914 the French and British output has not been available. Since then occasional heats have been produced under special arrangement with certain electric furnace operators, but the Pacific Electro Metals Co. is the first organization to undertake the production of this metal permanently. Dana & Co., 111 Broadway, New York, are the sole sales agents of the Pacific Electro Metals Co.

1917 Ingots

Set at 42,200,000 Tons by Institute—December Shows Loss

Production of steel ingots in December slumped heavily. The records of the American Iron and Steel institute show that 29 companies which produced 3,166,257 gross tons of steel ingots in November turned out only 2,733,722 gross tons in December, a drop of 432,535 tons.

These companies in 1916 produced 88.14 per cent of the companies' total output of steel ingots. On the basis of reports from these companies for 1917, the institute estimates that the total steel ingot production in 1917 was 42,200,000. The severe decline in December brought about a 400,000-ton cut in the institute's estimates as produced during the fall had indicated the 1917 total would reach 52,600,000 tons.

The 29 companies produced 37,187,325 gross tons during 1917. Their average monthly output was 3,098,944 gross tons or 365,222 tons more than December output. The following table shows the production record as reported by the institute:

	Total First six months	Third Quarter July-Sept.	Total First nine months
Open-hearth	13,621,483	6,599,048	20,280,531
Bessemer	5,164,139	2,411,108	7,575,247
Other	55,198	24,435	79,633
Total	18,900,820	9,034,591	27,935,411

	Oct.	Nov.	Dec.	Total 12 months
Open-hearth	2,475,754	2,384,218	2,195,832	27,336,335
Bessemer	870,494	772,489	524,084	9,742,314
Other	5,687	9,550	13,806	108,676
Total	3,351,935	3,166,257	2,733,722	37,187,325

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

LESLIE M. JOHNSTON, who has been secretary - treasurer and manager of the A. M. Byers Co., Pittsburgh, was recently appointed second vice president, a newly created position, with supervision over the A. M. Byers Co. of Ohio, of which S. K. Hine, Girard, O., is general manager. W. W. Williams, who was general sales manager has been made general manager; C. L. Jamison, who was assistant secretary and treasurer, is now secretary-treasurer, and T. L. Lewis, formerly assistant general sales manager, has been made general sales manager. E. M. Byers is president, and J. F. Byers is vice president of the company.

William C. Simcox has been made safety director of the General Fireproofing Co., Youngstown, O.

T. S. Disler has accepted a position with the Fort Pitt Steel Casting Co., McKeesport, Pa., as traffic manager.

F. Frith Pickslay of New York, has become sales manager of the Farrell-Cheek Steel Foundry Co., Sandusky, O.

A. A. Dawley now has charge of the branch office of the Union Supply Co., Chicago, opened up in the Call building, San Francisco.

G. W. Fowler has accepted a position in the sales department of the Detroit office of the New Departure Mfg. Co., Bristol, Conn.

Elmer H. Fish, employment manager of the Norton Co., Worcester, Mass., has been elected first vice president of the Employment Managers' association of that state.

L. H. Atkinson, of Atkinson & Utech, Inc., 111 Broadway, New York City, has just returned from a six weeks business trip in Italy and France.

W. H. Reaves has been placed in charge of the western sales office recently established by the P. & M. Co., Railway Exchange building, Chicago.

Charles A. Dana, president of the Spicer Mfg. Co., Plainsfield, N. J., has been elected partner in the New York stock exchange firm of William Morris Imbrie & Co.

George M. Moore spoke on "Glutrin" at the meeting of the Associated Foundry Foremen of New York and vicinity, held at the Hotel Chelsea, New York, Jan. 12.

George F. Fileshifter has been made superintendent of the Hoosier Cast-

LESLIE M. JOHNSTON

ings Co., Connersville, Ind. He was formerly employed by the American Foundry Co., Indianapolis.

R. A. Palmer, Pontiac, Mich., formerly the head of the Cartercar Co., has been made managing director of the Collier Motor Truck Co., Bellevue, O.

R. C. Stanley, general superintendent of the Bayonne, N. J., works of the International Nickel Co., has been elected first vice president to succeed E. F. Wood, who recently resigned.

W. P. Chinn, formerly general superintendent of the Mesaba range for Pickands, Mather & Co., Cleveland, has been appointed assistant general manager of all that company's iron mines under C. H. Munger.

C. D. Dyer Jr., formerly efficiency engineer with the By-Product Coke Corp., South Chicago, has accepted a position with the American and International Shipbuilding Co., Philadelphia.

George M. Verity, president American Rolling Mill Co., Middletown, O., since it was organized, has been appointed a member of the Ohio state war council by Governor James M. Cox.

R. T. Gladstone, formerly master mechanic for the Washington Steel & Ordnance Co., Washington, D. C., resigned recently to accept the position of general superintendent of the Steel Products Co., Huntington, W. Va.

Frank D. Chase, industrial engineer of Chicago, addressed the Chicago Foundrymen's club, at its annual meeting, Jan. 12, on "Efficient Foundries for Modern Foundrymen", and illustrated his lecture with stereopticon views.

Martin Oppenshaw, formerly advertising expert for several leading Wall street concerns, has accepted a position in charge of the advertising and publicity department recently opened by W. J. Crouch Co., Inc., 253 Broadway, New York, steel exporters.

William McLauchlan has retired from the firm of Pickands, Mather & Co., Cleveland, and his son Jay C. McLauchlan, who represented that company in Michigan territory for many years, has been admitted to the partnership.

Thomas P. Fredenburg, superintendent of the Almond Mfg. Co., South Ashburnham, Mass., maker of machinists' tools, is in a serious condition at Millers River hospital, Winchendon, Mass., from injuries sustained by being struck by a train.

G. E. Lewis, who for six years has been assistant purchasing agent for S. F. Bowser & Co., Ft. Wayne, Ind., resigned recently to accept a similar position with the tractor branch of the Moline Plow Works, Rock Island, Ill.

Frank Hitchcock, formerly postmaster general, has been elected temporary president of the Vulcan Steel Products Co., New York. A technical steel man will be selected later to whom Mr. Hitchcock will give place. This is a step in the reorganization of the concern which recently passed into control

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

of the syndicate headed by T. Coleman du Pont. Other companies owned are the Otrophon Steamship and Vulcan Trading.

J. H. Weller, formerly superintendent of the Whitney Mfg. Co., Hartford, Conn., manufacturer of chains, milling machines, etc., has accepted the position of production manager for the Templar Motors Corp., Cleveland.

E. H. Williams, who has been general superintendent of the McKeefrey Iron Co., Leetonia, O., has received a commission as major in the engineers, United States reserves. He has been ordered to active duty at Camp Lee, Petersburg, Va.

A. F. S. Blackwood, 1217 East High street, Springfield, O., has disposed of his interests in and has resigned from the Ohio Steel Foundry Co., which absorbed the Blackwood Steel Foundry Co. Mr. Blackwood was president of the latter company.

E. E. Keifer, who four years ago became affiliated with the Cambria Steel Co., Johnstown, Pa., has been transferred to Coatesville, Pa. He will serve in the capacity of chief draftsman at the Worth Bros. Co. plant of the Midvale Steel & Ordnance Co.

George W. Perks succeeds A. P. Lohmann as chief engineer of the B. F. Goodrich Co., Akron, O. He was formerly general manager of the American Seeding Machine Co., Springfield, O. Mr. Lohman resigned to open an office as an advisory industrial engineer in Akron.

W. P. Scheurman, manager of the Hill Pump Co., Anderson, Ind., for the past three years, has disposed of his stock holdings to George B. Ayers, the concern's president. He resigned recently and will locate in Washington as a broker, representing the Hill Pump Co., in that city.

W. P. Allen, chief engineer of the Anniston Steel Co., and the Anniston Ordnance Co., Anniston, Ala., resigned recently and is now affiliated with the engineering force of the Tennessee Coal, Iron & Railroad Co. Mr. Allen was connected with the engineering department of the Alabama Power Co., Birmingham, for a number of years but went to Anniston when the electric furnace plant was installed about a year and a half ago.

Charles Spalding, who recently resigned as sales manager of the Gisholt Machine Co., Detroit, has accepted a similar position with the Amalgamated Machining Corp., Chicago, manufacturer of machinery for the automobile and tire manufacturing trade.

Robert Mackenzie has been promoted from the position of pattern shop foreman of the Swedish Crucible Steel Co., Detroit, to that of assistant general manager. The company contemplates the addition of an electric furnace to its crucible and converter equipment.

W. B. Fortune, who was prominently identified with the building of the Quebec bridge, has been retained by the American International Shipbuilding Corp. in connection with ship construction at its hog Island, Pa., plant. He is now in Philadelphia organizing his department.

Charles S. Humphrey, who for several years has been president of the Humphrey Pipe & Foundry Co., Bellefontaine, O., has disposed of his interest therein and is now equipping a brass and aluminum foundry and nickeling plant. It will operate as the Humphrey Bronze & Aluminum Co., from Feb. 1.

Frank W. Hall, formerly sales manager for the Sprague Electric works of the General Electric Co., 527-531 West Thirty-fourth steret, New York, has been appointed commercial manager, after an almost continuous connection of 22 years. D. C. Durland, formerly executive head of this company has resigned to accept the presidency of the Mitchell Motors Co., Inc.

Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Mfg. Co., has been appointed head of the production division of the ordnance bureau, in which capacity he will follow up, supervise and stimulate the production of all articles purchased. This is a further step in the reorganization of the ordnance bureau.

Col. William S. Pierce, who for the last five years has been commandant of the United States armory at Springfield, Mass., has been relieved of his duties and ordered to report at the ordnance office in Washington. He is considered an authority on ordnance work. Major G. H. Stewart, junior in command at the armory, has been named as acting commandant.

E. B. Sutton, who has had charge of the mine rescue station at Birmingham, Ala., for the United States bureau of mines, for four years, has resigned. Mr. Sutton has located in Elkins, W. Va., where he will engage in other business and his former assistant, W. T. Burgess, will have charge of the rescue station until a permanent appointment is made by Director Manning at Washington.

Dr. Ira N. Hollis, president of the Worcester Polytechnic institute, Worcester, Mass., and formerly head of the American society of Mechanical Engineers, announced on his recent return from Washington that he has no intention of devoting his time exclusively to any department of the government and the government does not intend to take over the institute to train engineers for the service, as had been proposed.

Robert Moran, Seattle, Wash., has been named state director of the United States public service reserve. He was founder of the Moran Bros. Shipbuilding Co., now the plant of the Seattle Construction & Dry Dock Co. It will be part of his duty to index all the skilled labor in the state of Washington for the purpose of supplying essential industries with lists of mechanics in an effort to carry out the government's plans for the prosecution of the war.

Russell T. Gray, recent secretary of the Shuman Advertising Co., Chicago, has established an office in the First National Bank building, Chicago, as an advertising engineer. He was at one time employed by the Haynes Automobile Co., in the capacity of advertising manager. Advertising service will be rendered a limited number of clients in the technical field. Technical advertising in trade papers and magazines, as well as all forms of engineering catalogs and direct-by-mail advertising will be handled.

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Aim to Broaden Stock Dividend Ruling

MANAGEMENTS of many corporations have been watching with deep interest the developments indicating the government's attitude with regard to the taxing of stock dividends. Recently the United States Supreme Court handed down a decision in the case of Henry Towne, of the Yale & Towne Mfg. Co., against a tax collector, ordering the return to Mr. Towne of a sum of money which he had been levied as a tax on a stock dividend. Many people believed that the Supreme Court decision involved the general question as to whether stock dividends are income and therefore relieved them from taxation. Consequently some companies went ahead and formulated plans for the distribution of such dividends. But last week Commissioner of Internal Revenue Daniel C. Roper stated that he would decline to consider that the ruling applies to anything other than the income tax act of 1913, inasmuch as the income tax laws of 1916 and 1917 each contain specific provisions for the taxation of "stock dividends." While the decision of the supreme court speaks rather broadly of the reasons why stock dividends should not be considered income but merely capital adjustments, the treasury department takes the view that the 1913 act was the only issue involved in the case, and that consequently the ruling does not apply to the later acts.

That the revenue department appears to be splitting hairs in this matter, is the general feeling in the New York financial district. If the Supreme Court did not deal with the fundamental problem of taxing stock dividends in its recent decision, such question will have to be answered in later suits, for many corporations will not be content to let the status of the case rest with the opinion expressed by Mr. Roper.

"The court's decision is, in a sense, on a technical point," said Robert R. Reed, counsel of the Investment Bankers' association, "and does not reach the underlying question that will presumably have to be met in whatever legislation is attempted to tax the so-called accumulated earnings of corporations.

"Fundamentally the income earned by a company belongs to its stockholders during the period in which it is earned. They may not receive this income, but they can sell the right to it with their stock. If a stockholder sells his stock at an enhanced price the tax which he pays on a profit due to accumulated earnings is pro tanto the government's tax on those earnings.

"The price paid by the vendee is his capital and is invested in the accumulated earnings on which the vendor presumably pays the tax. If A bought 250 shares of stock in 1913 for $10,000 and sold them to B in 1917 for $50,000, A pays a tax on $40,000. If the company then declares a 100 per cent dividend, stock of cash, B receives back $25,000 of his capital in stock or cash. A tax upon it deprives him of his capital, not his income. It taxes him again on the profit made by A.

"The point is that the government already has received in fact a very large part of the tax which it aims to get by the taxation of stock dividends. The court has not yet had to deal with this fundamental problem. It has simply held what should hardly have needed an argument to prove, that to change a $100 bill for two $50 bills does not create income.

"A stock dividend, if anything, diminishes the legal rights of the stockholder as it deprives him of whatever possible power he might have had to enforce a cash distribution of the accumulated surplus. The government's intention to enforce the tax law of 1917 is necessarily subject to such legislation as may be enacted to meet the underlying problem."

Remits Taxes to Buyers

All steelmakers of late have been puzzled as to the method of disposing of the new war tax on freight rates. Up to a few days ago, the mills almost universally were charging the war tax to consumers in cases where the latter had bought their steel on a delivered basis, while the mills paid the war tax where the sale had been made on a Pittsburgh or mill basis. The independent makers, generally, still are adhering to this policy. The Steel Corporation, however, has decided that such a method is not equitable to the buyer. It therefore has decided not only to pay the war tax on freight charges for all goods sold on a delivered basis, but to send credits to all its customers against whom freight war tax charges had been made previous to this time.

Financial Crop Ends

The Bethlehem Steel Corp. has purchased the Bittinger lime stone quarries at Hanover, Pa., for $141,000. The quarries are to be equipped with modern machinery.

* * *

The Wharton Steel Co., purchased last year by J. Leonard Replogle and associates, is consolidating its floating debt and a $750,000 mortgage, through an issue of 2-year 6 per cent notes totaling $1,200,000. Of this, $1,000,000 has been placed and Chandler & Co., New York bankers, are offering about $200,000 of the notes at 94.

* * *

Almost unanimous approval was given in the vote taken at Beaumont, Texas, recently, to the proposition of issuing a $300,000 bond issue. This will provide funds to deepen the waterway from Beaumont to the sea two feet. Its present draft limit is 26 feet. This project is of importance to the Texas Steel Co., which contemplates building a steel plant at Beaumont.

* * *

The Impervious Metal Corp., 421 Wood street, Pittsburgh, has become the sole owner of the Alexapope Mfg. Co., Brooklyn, N. Y. Manufacture of baking japan and enamels will be continued and they will be sold under the trade name "Impervious" instead of "Alexapope", as heretofore. Charles E. Pope, who was practically sole owner of the Alexapope Mfg. Co. since its organization, is president of the Impervious Metal Corp.

* * *

Proceeds of the sale of $12,000,000 serial notes by the American Can Co.,

to the First National bank of New York, will be used principally to pay for tin plate. These will mature in equal installments in seven, eight, nine and ten months. The company is capitalized at $88,000,000, and last month wiped out accumulated dividends on its 7 per cent preferred stock. Five per cent bonds aggregating $11,872,500 remain outstanding.

* * *

Industrial securities which mature this year are considerably in excess of those which came due in 1916 and 1917. The total for 1918 is $184,070,753, nearly half of which is notes. Some of the largest of these are, the Winchester Repeating Arms Co., $16,000,000; the United Fruit Co., $10,000,000, and the International Harvester Co., $6,104,000. Among the important issues of bonds which mature in 1918 are, the United States Rubber Co., and subsidiaries, namely, the United States Rubber Co., $16,000,000; the General Rubber Co., $9,000,000, and Morgan & Wright debenture, $5,000,000. The total industrial securities of $184,070,753 top 1917 by $53,000,000 and 1916 by $99,500,000.

* * *

The following companies recently have increased their capital stock: Carrier Engineering Corp., Manhattan, N. Y., $250,000 to $300,000; Pratt Church Co., Frankfort, N. Y., $550,000 to $900,000; Twisted Wire & Steel Co., Manhattan, N. Y., $120,000 to $200,000; Donner Steel Co., Buffalo, $9,000,000 to $11,000,000; Halcomb Steel Co., Geddes, N. Y., $1,800,000 to $3,000,000; Christenson Machine Co., Racine, Wis., $5000 to $50,000; John Lauson Mfg. Co., New Holstein, Wis., manufacturer of gasoline engines and farm implements, $500,000 to $1,000,000; National Cast Iron Pipe & Foundry Co., Birmingham, Ala., $350,000 to $500,000; Boeing Air Plate Co., Seattle, $100,000 to $500,000; Royal Enameling & Mfg. Co., Chicago, $200,000 to $400,000; Benjamin Electric Mfg. Co., Chicago, $200,000 to $3,000,000; National Wire Wheel Works, Inc., Geneva, N. Y., $350,000 to $1,000,000; the Mechanical Mold & Machine Co., Akron, O., $10,000 to $150,000; the Hydraulic Pressed Steel Co., Cleveland, $5,700,000 to $7,200,000; the Detroit Range Boiler Co., Detroit, $120,000 to $210,000; the Empire Steel Products Co., Manhattan, $25,000 to $100,000; the Independent Stove Co., Owosso, Mich., $235,000 to $300,000; the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., $500,000 to $1,000,000; the Royal Enameling & Mfg. Co., Chicago, $200,000 to $400,000; the Cadillac Can Co., Detroit, $12,000 to $60,000; the Federal Nut, Bolt & Machine Co., Cleveland, $30,000 to $100,000; the Domestic Engineering Co., Dayton, $800,000 to $3,500,000; the Pennsylvania Crusher Co., Manhattan, $25,000 to $100,000; the Machine Appliance Co., Brooklyn, $12,000 to $50,000; the Steward Davit & Equipment Co., Manhattan, $22,500 to $82,500.

Few Miles

Added to Railroad Mileage in 1917—Domestic Car Orders Fall

Railroad building in 1917 almost paralleled the poor record of 1915, when but 933 miles were constructed. That year made the worst record since 1901, the year the *Railway Age* commenced to gather statistics. According to the data presented in the annual statistical number of the *Railway Age*, only 979 miles were built last year in the United States, while 10 years ago, in 1907, 5212 was the total new trackage. During last year, 451 miles were actually torn up, operation was abandoned on 491 miles more and the owners of 396 additional miles asked permission from state authorities to abandon it, a total of 1338 miles. Subtracting the mileage built from that figure, it leaves a net loss of 358 miles. Railroad building in 1916 aggregated 1098 miles as against 5623 miles in 1906 and the total mileage in 1915 was 933 compared with 4388 miles 10 years before. The figures for 1908, 1909, 1910, 1911, 1912, 1913 and 1914 are 3214, 3748, 4122, 3066, 2997, 3071 and 1532 miles, respectively.

About 50 per cent represents the falling off in freight cars ordered for domestic use in the United States and Canada in 1917 as compared with 1907. Only 79,367 were ordered in 1917 against 151,711 in 1907. In 1916, 165,324 were ordered as against 310,315 in 1906, and the figures for 1915 and 1905 are 109,792 and 341,315, respectively. In 1917, 19,024 freight cars were ordered for the United States government, while 64,667 represents the total number ordered for France, Russia and other European countries. This brings the 1917 total to 164,058, which includes the 30,500 Russian cars, orders for which are held in abeyance. The passenger cars ordered totaled 1167 in 1917, including 1124 for domestic use, this figure being the smallest since 1901. The smallest previous year was 1908 when 1319 were ordered. The largest year since 1901 was 1909, when 4514 was the total of passenger cars ordered.

Foreign orders also added greatly to locomotive orders. In 1915, 1916 and 1917 only 7207 were ordered for domestic use as against 15,389 ordered in 1905, 1906 and 1907, a decrease for the three-year period of 53.1 per cent. In addition to 2704 locomotives ordered in 1917 for domestic use in the United States and Canada, 2057 were ordered for the United States government with 2881 for England, France, Russia and other European countries. This brought the actual total for 1917 to 7642. This total includes the Russian order for 1500 locomotives now held in abeyance. Other years when domestic orders were small are 1908, 1914 and 1915, with 1182, 1265 and 1612, respectively, being the figures. The largest year was 1905, when 6265 locomotives for domestic use were ordered.

Await Licensing

Of Ammonium Sulphate Shipments Under Fovernment Direction—Benzol

New York, Jan. 12.—The licensing system which was applied to sulphate of ammonia by the recent proclamation by President Wilson, has not yet been definitely formulated. This system, which was necessitated by the government's need of sulphate of ammonia to make nitrate of ammonia for the manufacture of high explosives is expected, after it has been in effect a few weeks longer, to apply to every pound produced. Pending definite instructions, producers of this product still are relying on their own judgment in distributing the comparatively small amounts which are left after taking care of current government requisitions. Sulphate of ammonia still may be quoted nominally at $4.90 to $5 per 100 pounds at seaboard for spot shipment. No contracts are being taken.

Sales of benzol this week involved a number of contracts, including several large ones, but demand is not nearly as active as a few weeks ago. Although prices are unchanged, the tendency is toward weakness. Pure benzol is quoted at 35 to 40 cents per gallon, both for spot and contract. Current inquiry involves several good-sized quantities, but is smaller than usual.

Phenol continues strong at 53 to 54 cents per pound for spot. No contract phenol is to be had. Sales of solvent naphtha during the past week did not represent a large total. Although new inquiries are few, the market continues firm at 18 to 22 cents per gallon. All toluol in excess of that required for filling old contracts, continues to be shipped on government requisitions.

Coke Oven By-Products

Spot

Per Gallon at Producers Plant

Pure benzol	$0.35 to .40
Toluol (nominal)	1.70 to 1.80
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol	$0.52

Per 100 Pounds at Seaboard

Sulhate of ammonia (nominal)	$4.90 to 5.00

Contract

Per Gallon at Producers Plant

Pure benzol	$0.35 to .40
Toluol	nominal
Solvent naphtha	.18 to .22

Per Pound at Producers Plant

Phenol nominal.

Per 100 Pounds at Seaboard

Sulphate of ammonia..... nominal

Survey of Tool Industry Progresses

Machine Tool Section of War Industries Board Gathers Data Pertaining to Tool Industry—Government Commandeers More Tools for Destroyer Plant—Huge Machine Gun Contract Awarded to New England Company

CO-ORDINATION of the supply, production and sales subdivisions of the machine tool industry and the collection of data pertaining to these branches which was proposed a short time ago and lately undertaken by the machine tool section of the war industries board, is likely to result in greater production efficiency and a much more expeditious handling of orders. This data, after classification, will facilitate the making of plans with a degree of certainty hitherto impossible, and enable a gaging of the rapidity with which new projects may be completed, ready for operation. It may also afford a means of determining negligence, inefficiency and incompetence either in builder, dealer or politician, in the event of any further government investigations conducted along the lines of that lately concluded.

Although the current of war orders gradually is flowing westward and many manufacturers of products now regarded as nonessentials are diverting their facilities to the production of munition or war materials, the east still continues active in its demands for machine tools. A dearth of extremely large tool lists, however, is in evidence in that section. Lately inquiries from foreign sources have been received in increasing numbers, but owing to the government's new plan of seizing tools intended for neutral countries this class of inquiries is worthless so far as domestic builders and dealers are concerned. The recent placing of an order for 15,000 machine guns with an eastern manufacturer has as yet been unproductive of an inquiry for tools.

A fair volume of crane inquiries, well scattered, is current in the New York market. These, generally, are for electric traveling cranes. Contracts for two of the huge 350-ton cranes for the navy yards at Norfolk and Philadelphia have not been let, although the actual construction of the third crane, which is for the Brooklyn navy yard, has been started. Sales of punching and shearing machinery have been numerous.

Reports From Districts Show Mixed Conditions

MACHINE tool builders throughout Ohio are receiving communications from the government which indicate that the plan proposed some time ago of establishing a central purchasing bureau is rapidly taking form. Amplifying this statement a letter to a builder of planers may be cited. This builder was asked by the government to give data relative to prices, best delivery dates and other details on 565 planers, 450 to be 36 inches or larger. A number of other builders have also been requested to supply information of a like character. Machine tool prices still are tending upward. One dealer reports that prices on shearing machinery, lathes and automatic drilling machines have been increased. Cleveland machine tool dealers are experiencing no difficulties in securing new business, but are hampered considerably with the prevailing sluggish deliveries. The Chandler Motor Car Co., Cleveland, it is understood, is negotiating for government work. A government contract for motor truck trailers has been awarded the Grant Motor Car Corp., Cleveland, which recently acquired the Denneen Motor Co., maker of trucks, also of Cleveland. The Aluminum Castings Co., Cleveland, is in the market for the following equipment: One 16-inch x 6-foot lathe; one 18-inch x 6-foot lathe; one 20-inch x 8-foot lathe; one 3 or 4-foot radial drill; one 20-inch shaper; one milling machine, and one upright drilling machine. A supplementary tool list issued by the Ohmer Fare Register Co., Dayton, O., includes the following items: One heavy engine lathe, 36 to 60 inches swing; one 6 or 7-foot vertical boring mill; several planers, 42 inches or larger; and a number of gear cutters. A detailed list of the requirements of Victor R. Browning & Co., Mansfield, O., mention of which was previously made, follows: One 14-inch tool room lathe; two 16-inch engine lathes; one 18-inch engine lathe; four 24-inch engine lathes; three 20-inch engine lathes; one 60-inch engine lathe; three 42-inch vertical boring mills; one 60-inch vertical boring mill; two 72-inch vertical boring mills; one 120-inch vertical boring mill; 12 horizontal boring mills; one 20-inch shaper; two 24-inch shapers; one universal milling machine; one plain horizontal milling machine; two plain horizontal milling machines; one 20-inch slotter.

Government Collects Data for Central Purchasing Bureau

WHILE apparent quiet rules the Chicago machine tool market an occasional large inquiry keeps the market fairly active. Generally, buyers are not inquiring for much equipment and the holiday lull which usually lasts past inventory time still continues. However, the Standard Steel Car Co. is seeking more equipment for its plant at Hammond, Ind., where a heavy munition order is to be cared for and several manufacturers who have taken on shell contracts are looking for additional machinery. Dealers and buyers have found that priority orders possess comparatively little value at present on account of their number and constantly changing conditions. At present the priority board determines individual cases without regard to certificates. A new feature is coming to the front in the market for machinery as the need for machines and products formerly imported is becoming more pressing. Local manufacturers are changing the nature of their output to include devices formerly obtained from Europe, but now cut off by the

Might

The might inherent in a "mite" of AGATHON ALLOY Steel—that enables it to withstand successfully year after year, terrific strains and stresses hundreds, yes, *thousands* of times out of proportion to its size, is but a reflection of the METHODS used in producing it.

In other words, the might of Agathon Steels is the result of giant intellects and giant machinery working in perfect harmony.

Agathon Steels will serve your purpose best.

The Central Steel Company
Massillon, Ohio

Branch Offices

DETROIT OFFICE: 326-27-28 Ford Bldg.,
F. Walter Guibert, District Representative
CLEVELAND OFFICE: Hickox Building,
The Hamill-Hickox Company, District Representative.
CHICAGO OFFICE: 1370 People's Gas Bldg., 122 So Michigan Blvd., *C. H. Beach, Dist. Sales Mgr.*
PHILADELPHIA OFFICE: 603 Widener Building,
Frank Wallace, District Sales Manager.
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war. Instances of such changes are becoming more common from time to time. The city of Quincy, Ill., will build an auxiliary pumping station. The William Glader Machine Works, Chicago, will build a three-story factory in connection with its present plant. The Wagner Electric Co., St. Louis, is building a plant for the manufacture of shells. The St. Louis Malleable Casting Co., St. Louis, has plans ready for a large plant including offices and factory buildings. The Detroit Shell Co., Detroit, has obtained a plant which it will proceed to equip for the manufacture of artillery shells. The city of Everett, Wash., is having plans prepared for a municipal hydro-electric plant to furnish power and light for the city.

Many Machine Tools Seized by Government

GOVERNMENT commandeering of machine tools is increasing. The Brooklyn navy yard has just seized a number of milling machines and other tools which had been held in New York warehouses for Scandinavian and Holland buyers. Various government plants continue to absorb machine tools, although there are fewer of the sensational lists which characterized the market a few months ago. Shipbuilders still are a prominent factor in the market, but the larger proportion of such buying seems to have been completed, although deliveries of much of this equipment are yet to be made.

The largest list to come to the attention of the New York market this week consists of 85 big lathes, 36-inch and over, for the destroyer plant of the Fore River Shipbuilding Corp. The Morse Dry Dock & Repair Co., Brooklyn, whose plant recently was damaged by fire, has been buying considerable machinery, having ordered an aggregate of 40,000 from one dealer. The Watson-Stillman Co., 50 Church street, New York, New York, which has a government contract for hydraulic jacks for 9.5 guns, and which is building a plant addition, has ordered about $40,000 worth of general machine shop equipment, including lathes, drills, planers, shapers, etc., and expects to place orders for about $60,000 more. The Meade-Morrison Co., Gloucester, Mass., which has a government munition contract, is doubling its plant capacity and will buy additional equipment, including hydraulic presses. The Watervliet arsenal, Watervliet, N. Y., which recently placed orders for about $500,000 worth of tools, mostly lathes, with a Cleveland company, is inquiring for a few additional tools, including radial drills and lathes. The Submarine Boat Corp., New York, has been in the machinery market almost constantly for miscellaneous requirements for the Newark bay shipyard. The Groton Iron Works, Groton, Conn., has bought pipe cutting and threading machinery and is in the market for additional tools. The General Electric Co. has not closed against the list of $300,000 worth of machine tools for its Lynn, Mass., plant, which it reissued recently. The New England Westinghouse Co., which has received a government contract for 15,000 or more Browning machine guns, has been watched with interest by sellers in the New York market, but as yet has issued no general inquiry.

Contract Let for World's Largest Crane

The demand for cranes continues to come out in fair volume. The American Shipbuilding Co. is understood to be figuring actively on several locomotive cranes and other miscellaneous equipment for its yard which now is under construction at Alexandria, Va. Some equipment was placed by the company early last fall. Additional cranes for the Brooklyn navy yard also are being figured upon at this time, the inquiry being for one 40-ton and two 10-ton electric cranes for the machine shop. The McMyler-Interstate Co. recently was awarded a contract for a 350-ton outfitting crane for the Brooklyn yard. This is the largest crane ever proposed and will cost approximately $800,000. Negotiations on two additional cranes of similar size are still pending for the government yards at Philadelphia and Norfolk. The inquiry of the Federal Shipbuilding Co. for 11 electric traveling cranes continues before the market. Two locomotive cranes for the Pennsylvania railroad also are pending. The inquiry of the J. G. White Engineering Co. for a 60-ton electric crane, which has been out for some time, has not been closed. The Morse Dry Dock & Repair Co., Brooklyn, has closed on a 10-ton electric traveling crane in connection with considerable miscellaneous equipment. The Braden Copper Co. also has purchased a 10-ton crane. Some sizable business is being placed by domestic consumers for punching and shearing equipment. Several inquiries also are in the market from Norway and Japan, but this business cannot be considered at this time, owing to prevailing embargoes. The requirements of the Foundation Co., which is building wooden ships at Newark Meadows, N. J., are unfilled.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

GROVETON, N. H.—The factory of the Odell Mfg. Co. has recently been damaged by fire with a loss of $100,000.

PORTSMOUTH, N. H.—The Atlantic Engine & Shipbuilding Co., New York, has purchased the plant formerly operated by the Colonial Paper Co., which it will equip for the building of steel vessels for the government.

ATHOL, MASS.—Fire damaged the plant of the Athol Mfg. Co., Jan. 4, to the extent of $10,000, and caused a shut down of two weeks.

BOSTON.—The Edgar Levinstein Co. has been incorporated to manufacture chemicals. The company has a capital of $250,000 and its incorporators are Edgar Levenstein, Harry R. Davies and others.

BOSTON.—The Northway Motors Corp. has been chartered to manufacture motor vehicles with $5,000,000 capital. Ralph H. Northway, Cincinnati; James H. Walkes, Amesbury, Mass.; James F. Finneran and James F. Cavanaugh, Everett, Mass., are the incorporators.

CAMBRIDGE, MASS.—The terminal repair shop and roundhouse of the Boston & Maine railroad were damaged by fire Jan. 5 with a loss of $200,000.

FRAMINGHAM, MASS.—The R. H. Long Co. has been incorporated to manufacture

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Rolling Mill Jim.

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EAST CHICAGO, IND.

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machinery with $10,000,000 capital. Richard H. Long, Richard F. Long and George H. Farrar are the incorporators.

GLOUCESTER, MASS. — The Mead-Morrison Mfg. Co. will build an 84 x 240-foot annex to its munitions plant, which will be equipped with two 450-horsepower hydraulic presses.

GLOUCESTER, MASS.—An 84 x 240-foot addition will be erected at the plant of the Mead-Morrison Mfg. Co., south of the present works. Plans call for completion of the work in 30 days. It is understood that considerable new equipment will be installed, including two 450-horsepower hydraulic presses.

NORTH GRAFTON, MASS.—The factory of the Hi-Lo-Jack Co., maker of auto jacks, suffered a fire loss of $15,000 to its machinery recently.

NEW BEDFORD, MASS.—Plans are being prepared for a brick and steel frame, 1-story and basement, 98 x 126-foot power station to cost $300,000, for the Union Street Railway Co., on Middle street. The New England Structural Co., Boston, will furnish the steel work.

SOUTH BOSTON, MASS.—Contract has been let for a brick and steel, 1-story, 60 x 300-foot addition to the factory of the S. A. Woods Machine Co., Alger street.

SOUTH BOSTON, MASS.—The Gillette Safety Razor Co. will build a steel and concrete, fireproof, 7-story factory building to cost $800,000 adjoining its present plant. The new structure will increase the company's output 60 per cent.

WATERTOWN, MASS.—The Stone & Webster Engineering Corp., Boston office, has been awarded contract at $360,000 for erecting an addition to the plant for the manufacture of gun carriages at the United States arsenal.

WESTFIELD, MASS.—The Westfield Mfg. Co. has let the contract for a 1-story, 62 x 400-foot factory building.

WINCHESTER, MASS. — The Whitney Machine Co. has been incorporated with a capital of $100,000 to engage in the foundry and machinery manufacturing business. The incorporators are Arthur E. Whitney, Robert F. Whitney and Walter C. Goddard.

PAWTUCKET, R. I.—Plans are being drawn for an addition to the factory of the William H. Haskell Mfg. Co., maker of bolts, Main, Pine and Bayley streets.

PROVIDENCE, R. I.—The Bourn Rubber Co. has let the contract for a brick, 1-story, 100 x 162-foot manufacturing building on Waldo street, to be used as an addition to its wire department.

WOONSOCKET, R. I. — The Providence Knitting Co. will enlarge its plant by the erection of a 1-story addition, 40 x 50 feet, in size.

BRIDGEPORT, CONN.—The Modern Mfg. Co. will build a 1-story addition to its factory at 73 Third street.

BRIDGEPORT, CONN.—The General Machine & Mfg. Co. has been incorporated to make metal goods, machinery and tools, with $50,000 capital. Axel H. Nilson, David Hjorta, Mauritz Olson, Jacob Nilson and John M. S. Anderson are incorporators.

HARTFORD, CONN.—The Cushman-Church Co. has awarded to the Ellison Construction Co., 60 Prospect street, contract for a $20,000 factory addition, 1-story high, 90 x 110 feet. Ford, Buck & Sheldon are engineers.

MERIDEN, CONN.—The E. J. Doolittle Co. has been incorporated to manufacture metal products, etc., with $40,000 capital by E. J. Doolittle, LeRoy Holmes, O. S. Gillette and William E. Johnson.

NEW BRITAIN, CONN.—Landers, Frary & Clarke, manufacturers of hardware, have awarded the contract for a 3-story factory building, 56 x 155 feet, to the Torrington Building Co., Torrington, Conn.

NEW HAVEN, CONN.—The New York, New Haven & Hartford railway will build a 45 x 66-foot addition to its machine shop at Cedar Hill and will install new machinery for repairing locomotives.

NEW HAVEN, CONN.—The Marlin Arms Corp. has let the contract to Fred T. Ley & Co., Inc., Springfield, Mass., for a brick and steel, fireproof, 1-story factory on Dixwell avenue, to contain 40,000 square feet of floor space.

STAMFORD, CONN. — Additions to the plant of the John Davenport Foundry Co. are contemplated by a New York syndicate which recently took over the property and which is headed by George C. Rosenbaum. The principal building to be erected will be 50 x 200 feet with an ell, 50 x 192 feet. It will be two stories high, of reinforced concrete construction. It is understood that considerable additional equipment will be needed.

WATERBURY, CONN.—The Connecticut Brass & Mfg. Co., which recently bought the plant of the Piling Brass Co., plans to erect an additional story to one of the buildings.

WATERBURY, CONN.—The Scovill Mfg. Co., East Main street, has let the contract for a concrete, 5-story, 70 x 217-foot factory with a 20 x 73-foot ell, to cost $200,000. The company also will build a brick and steel, 3-story, 42 x 92-foot factory to cost $40,000 on the same street.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y.—The Sidel-Rattner Mfg. Co. has been incorporated with $12,000 capital to manufacture automobile accessories. R. Sidel, C. D. Brandt and C. Rattner, 18 Dunham place, are incorporators.

BROOKLYN, N. Y.—Meurer Bros. have been incorporated with a capital of $750,000 to manufacture steel barrels. The incorporators are C. H. Bolles Jr., A. and J. Meurer, 266 Lincoln place.

BROOKLYN, N. Y.—The Kasper & Koetzle Hardware Co. have been chartered to manufacture hardware with a capital of $50,000. The incorporators are F. Koetzle, C. and W. Kasper, 565 Bushwick avenue.

BROOKLYN, N. Y.—The High Efficient Motor Corp. has been incorporated with $200,000 capital to manufacture motors, engines and automobiles. The incorporators are M. Leventhal, W. Rabsilber and R. E. Weber, 1014 Bushwick avenue.

BUFFALO.—The Lumen Bearing Co. plans to erect a 1-story 25 x 40-foot addition to its brass foundry.

BUFFALO.—The General Drop Forge Co. has been incorporated with $10,000 capital. The incorporators include E. H. Letchworth, C. M. Baldy and W. M. Wilkins.

BUFFALO.—The Wm. H. Race & Sons Motor Co. has been organized with $25,000 capital. The incorporators are W. H., L. W. and W. H. Race Jr.

BUFFALO.—The plant of the Excelsior Steel Ball Co., Military road, has been damaged by a fire in the tempering department which caused a loss of about $6000.

BUFFALO.—The Curtiss Aeroplane & Motor Co. contemplates the construction of a 1-story factory building at 2000 Elmwood avenue.

GRASMERE, N. Y.—The Durkee Mfg. Co. has been chartered with a capital of $100,000 to manufacture compasses for airplane and marine service. The incorporators are W. H. and J. W. Durkee and F. A. Wurzbach, 381 East 165th street.

JAMESTOWN, N. Y.—The plant of the Curtiss Machine Co. has been damaged recently by fire, the loss amounting to about $50,000. The plant is a branch of the Curtiss Aeroplane & Motor Co., Buffalo.

LONG ISLAND CITY, L. I., N. Y.—The William F. Meyers Co. contemplates the erection of a $7000 addition to its plant. John N. Baker is architect.

NEW YORK.—The Wire Wheel Corp. of America, 831 Eleventh avenue, has purchased a site adjoining its present plant, upon which it plans to build an addition.

NEW YORK.—The Universal Sheet Metal Works has been incorporated with $100,000 capital. The incorporators include J. Lefkowitz, R. and R. Sadwith, 3202 Perry avenue.

NEW YORK. — J. Chatillon & Sons, 85 Cliff street, manufacturers of scales, have increased their capital stock from $200,000 to $300,000 to provide for the erection of a plant addition.

NEW YORK.—The Manville Mfg. Corp. has been chartered with a capital of $300,000 to manufacture fire extinguishers. Among the incorporators are R. Bennett Jr., R. Sherman and R. W. Evans, 144 Wall street.

NEW YORK.—The Russian Steel Export Co. has been organized with $200,000 capital. The incorporators include J. P. Beal, H. W. McAteer and C. R. McElhany, 233 Broadway.

NEW YORK.—A charter has been granted to Whittaker, Clark & Daniels, capitalized at $100,000. The company will engage in the manufacture of chemicals and metal polishes. Incorporators include W. B. Daniels, L. E. and S. H. Clark, 250 Front street.

NEW YORK.—A charter of incorporation has been granted to the Krisfo Tool & Chemical Corp., organized with $75,000 to engage in a boiler-making and machine shop business. C. Kriser, D. D. Walter and E. Sayer, 208 West 119th street, are interested.

OGDENSBURG, N. Y. — A $40,000 coal pocket will be erected by the George Hall Coal & Transportation Co. Adolph Suck, Hyde Park, Mass., is architect.

PORT IVORY, L. I., N. Y.—The erection of five factory buildings is being planned by the Proctor & Gamble Mfg. Co., Cincinnati. The Ferro Concrete Construction Co. will be the builder.

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BRANCH OFFICES

NEW YORK PHILADELPHIA CHICAGO

ROCHESTER, N. Y.—The Taylor Instrument Co., 95 Ames street, manufacturer of thermometers, has awarded the contract for a 3-story, 25 x 95-foot addition to its factory.

OIL CITY, PA.—The plant of the Oil City Foundry Co. has been damaged by fire. The cupola building is an entire loss, as is part of the main foundry.

OIL CITY, PA.—The Independent Tack Co., Harrisburg, Pa., will remove its factory to this city. S. G. Catchpole is president.

PITTSBURGH.—The hammer shop and 21-inch mill at the Park plant of the Crucible Steel Co. of America, was badly damaged by fire Jan. 1.

BEAVER FALLS, PA.—The G. H. Hamilton Mfg. Co., manufacturer of stoves, will erect a new factory, for which contract has been awarded.

BRADFORD, PA.—The pattern plant of E. R. Caldwell & Co., Hilton street, manufacturer of machines, has been severely damaged by fire with a loss estimated at $100,000.

GROVETON STATION, PA.—The Lewis Foundry & Machine Co. plans a 100-foot addition to its plant and has bought a 30-ton crane and other equipment. The company makes gray iron castings and rolling mill machinery.

HARRISBURG, PA.—The plant of the Harrisburg Pipe & Pipe Bending Co. has been damaged by fire with a loss of several hundred thousands of dollars. The company has been making 4-inch shells for the government.

LANSDOWNE, PA.—The York Steel Corp. has been organized with a nominal capital of $5000. Frank A. Moorhead is interested.

LATROBE, PA.—The Keystone Automobile & Machine Co., recently organized with a capital of $15,000, plans to build a factory. B. Ratner is in charge.

PHILADELPHIA.—Wirt & Knox, Sedgley avenue, manufacturers of brass specialties, plan to build an addition to their plant.

PHILADELPHIA.—The Lanston Monotype Machine Co., Twenty-fourth and Locust streets, will build a 1-story concrete plant addition to cost $20,000.

PHILADELPHIA.—The N. Z. Graves Co., 22-24 South Third street, will build a 2-story foundry and pattern shop at Chestnut and Thirtieth streets.

PHILADELPHIA.—The J. A. Clark Iron Foundry Co. has had plans prepared for an addition to its plant at Thirty-fifth street and Grays Ferry road.

PHILADELPHIA.—The Hudson-Peck Machine Products Co. has been granted a charter of incorporation. The company is capitalized at $60,000 and Raymond Hawley is interested.

PHILADELPHIA.—The Quaker City Motortruck Mfg. Co. has been chartered with

NEWPORT NEWS, VA.—The Chesapeake & Ohio railroad has awarded the contract to Harwood & Morse for the erection of a $20,000 addition to its freight house.

$1,000,00 capital. The incorporators include Joseph D. Morelli, Charles L. Guerin and John Morelli.

PHILADELPHIA.—A permit has been granted to Charles H. Caspar, Thirty-first and Jefferson streets, for a 2-story reinforced concrete 33 x 47-foot shop addition to cost $18,000. Contract has been awarded to F. A. Poth & Sons.

PHILADELPHIA. — Sterns, Woodnut & Schmehl, engineers, will receive bids shortly for a $30,000 factory building. The structure will be three stories high and 50 x 225 feet. The original plans for this project have been revised.

PITTSBURGH.—The Miller-Owen Electric Co. plans to erect a 1-story, 40 x 200-foot warehouse, to cost $40,000. H. S. Kesuler, 3301 Penn avenue, is engineer.

READING, PA.—The Berks Engineering Co., Seventh and Chestnut streets, has increased its capital from $25,000 to $150,000 to provide for the erection of an addition to its machine shop.

SHARON, PA.—The Standard Car Construction Co., Columbia Bank building, Pittsburgh, has increased its capital from $1,000,000 to $2,000,000 and plans additions and improvements to its plant.

ALDENE, N. J. — The Marconi Wireless Co. will erect an addition to its plant to cost $50,000.

CLIFTON HEIGHTS, N. J.—Frank E. Hahn, architect, is in charge of installing new machinery and power equipment and making alterations to the municipal power plant.

NEWARK, N. J. — Fire recently caused a serious loss at the plant of Federal Shipbuilding Co., Kearney meadows.

EDGEWATER, N. J.—The American Can Co. is in the market for considerable new machinery and equipment for its proposed new plant.

DOVER, N. J.—Charles Butters, Oakland, Cal., has purchased a 10-acre plot along the Morristown & Erie railroad and will erect 21 iron and steel structures to be used as an aluminum bronze works. The plant will consist of a warehouse, 30 x 125 feet, a melting house, 50 x 125 feet, six grinding units, 10 x 60 feet, four boiler houses, a machine shop, etc.

JERSEY CITY, N. J.—The New York Revolving Portable Elevator Co., 346 Garfield avenue, has awarded the contract for the erection of a 1-story addition to its plant.

JERSEY CITY, N. J.—Twenty acres of land, fronting on Newark bay, have been purchased by Colgate & Co. for the erection of a large plant. Details of the project have not been divulged.

KINGSLAND, N. J.—The plant of the Canadian Car & Foundry Co., which was damaged by fire last February has been sold to a company manufacturing chemicals. The new owner expects to equip the factory for the manufacture of commercial chemicals. The property consists of 85 acres of land along the Hackensack meadows and the main line of the Delaware, Lackawanna & Western railroad.

LYDEN, N. J. — MacGovern & Co., 114 Liberty street, New York, are having plans revised for a 1-story, 100 x 203-foot machine shop. Fletcher-Thompson, Inc., Bridgeport, Conn., is engineer in charge.

NEWARK, N. J.—The trustees of Overbrook hospital will erect new filter beds at the electrolytic disposal plant, to cost $52,500.

NEWARK, N. J.—The Federal Real Estate Co. will build a machine shop at 41 Bryant avenue, to be 25 x 90 feet.

NEWARK, N. J.—J. Campbell & Co., Plum Point Lane, have had plans prepared for a 1-story, 25 x 80-foot machine shop.

NEWARK, N. J.—The A. Buermann Mfg. Co., 220 Jelliff avenue, will build a 1-story, 52 x 57-foot addition to its foundry. Cost is estimated at $7000.

NEWARK, N. J.—The Splitdorf Electrical Co., 98 Warren street, manufacturer of spark plugs, will build a 2-story addition to its plant.

NEWARK, N. J.—William E. Lehman, 738 Broad street, is interested in a machine shop to be built on New Jersey Railroad avenue. The build will be three stories high.

Activities in the Central States

BELOIT, WIS.—The capital stock of the Mattison Machine Works has been increased from $25,000 to $225,000 to provide for additions to its foundry and machine shop. The company manufactures woodworking machinery, shapers and lathes. C. W. Mattison is president and manager.

DE PERE, WIS.—The Western Steel & Mfg. Co. is preparing to build an addition to its plant and power house to cost $25,000.

EAU CLAIRE, WIS.—The Girnan & Sons Co., manufacturer of vehicles, will build a factory and machine shop 45 x 150 feet to cost $25,000.

FOND DU LAC, WIS.—The Damrow Bros. Mfg. Co., manufacturer of milk cans and other galvanized sheet metal specialties and stampings, owing to the shortage of sheet tin, will install a rolling mill to manufacture its own supply of sheets from the rough pig. Equipment will be ordered at once.

JANESVILLE, WIS.—Bids will be taken about Jan. 15 for the erection of a solid brick addition, 36 x 36 feet, to the pumping station, and a new scale room, 14 x 14 feet, to the boiler house of the Janesville municipal waterworks system.

KENOSHA, WIS.—The Kincannon Silent Transmission Co. has been incorporated with a nominal capital of $3200 by George C. Kincannon and J. J. Blaine.

MENASHA, WIS.—The Menasha Wire & Mfg. Co. is having plans prepared for a plant to cost $30,000.

MILWAUKEE.—H. F. Blakney, A. M. Berger and Maurice A. McCabe, have organized the Old Abe Mining Co., with a capital stock of $25,000, to develop lead and zinc properties in southwestern Wisconsin.

MILWAUKEE.—The Liberty Foundry Co., which recently awarded contracts for the erection of a gray iron shop to cost about $15,000, is taking bids on equipment and electric motors. W. J. Buckley, 852 Grant boulevard, treasurer of the company, is in charge.

MILWAUKEE.—The Van Dyke Knitting Co., Sixteenth avenue and South Pierce street, has awarded contracts for a 2-story factory addition, 90 x 165 feet, of brick, and concrete, mill construction, with an automatic sprinkler system, to cost about $40,000. Herman J. Esser, Camp building, is architect.

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Chicago, to prepare plans for a reinforced concrete, steel and brick warehouse building, six stories high, 62 x 150 feet. The estimated cost is about $100,000. Wm. J. E. Schaus is general manager.

MILWAUKEE.—Articles of incorporation have been filed by the United States Aero Propeller Co. The capital stock is $30,000. The incorporators are Fordyce H. Bottum, Frank L. McNamara and John H. Hurley, all members of the law firm of Bottum, Bottum, Hudnall & Lecher, Pabst building. A definite statement concerning the company's plans will be made later.

RICE LAKE, WIS.—The Rice Lake Advancement association has offered to the Wisconsin Aluminum Foundry Co., Manitowoc, Wis., to provide a free site, a suitable plant and further co-operation if it will reestablish its plant. The offer is under consideration.

RACINE, WIS.—The Hamilton & Beach Mfg. Co., small electric motors and motor-driven devices, will award contracts Jan. 10 for the erection of a 3-story factory addition, 80 x 150 feet in size. The improvement will cost about $75,000. Fred J. Osius is general manager.

RACINE, WIS.—The Belle City Malleable Iron Co., Racine, Wis., which sustained an estimated loss of between $75,000 and $100,000 by fire Jan. 5, is preparing to rebuild immediately. The main building was badly damaged, together with five freight cars loaded with materials. The building was 80 x 120 feet, 2 stories, brick, and was used as a pattern shop, core room, stockroom, shipping room, and superintendent's office, in addition to being the main machine shop. The plant was the largest of the kind in Racine. J. A. Chapman is president.

SOUTH MILWAUKEE, WIS.—The Caldwell Engineering Co., Jacksonville, Ill., has been engaged by the city to make a survey and prepare estimates on an additional pumping engine for the municipal waterworks system. J. F. Lorig is mayor.

WRIGHTSTOWN, WIS. — The Wisconsin state highway commission will take bids after Jan. 20 for the construction of a 75-foot steel and concrete bridge, with 20-foot roadway. M. W. Torkelsen, state bridge engineer, is completing plans.

WAUSAU, WIS.—Bids will be taken about March 1 by architects Swarthout & Spear for the erection of the first unit of a $250,000 industrial and vocational training institute in this city. It will be E-shaped, each unit being 90 x 200 feet. S. B. Tobey is superintendent.

BENTON HARBOR, MICH.—The Metal Specialties Co. has been incorporated with a capital of $87,000 to manufacture metal devices and machine parts. Incorporators include William R. Everett, A. R. Knight and Milton Hinkley.

DETROIT.—The A. Colton Co., 782 East Jefferson street, manufacturer of machinery, is building an addition.

DETROIT.—The Detroit Shell Co., recently incorporated with $2,000,000 capital, will occupy the plant of the Springfield Body Co., which it will equip for the manufacture of shells. J. Kelsey is president.

CHICAGO. — The William Glader Machine Works, 210 North Ann street, will build a 3-story factory 50 x 100 feet, to cost $20,000.

CHICAGO.—The Hughes Electric Heating Co. will build a 1-story, brick factory to cost $30,000.

CHICAGO. — The W. Gladden Machine Works will build a 3-story factory, 50 x 100 feet for which contract has been awarded.

CHICAGO.—The pattern warehouse of the Reedy Foundry Co., 4600 Iowa street, has been damaged by fire with $25,000 loss. The company has been making castings for submarine engines.

CHICAGO.—Rosenwald & Weil, J. E. Weil, president, 508 South Franklin street, will build a manufacturing plant covering 166,000 feet of ground, to include a power plant, machine shop and manufacturing buildings, cost is estimated at $200,000.

CLEARING, ILL. — The Standard Steel Castings Co., care Davidson & Weiss, architects, 53 West Jackson boulevard, Chicago, will build a 1-story addition 126 x 402 feet in size, to cost $100,000.

MONMOUTH, ILL.—The plant of the Boss Mfg. Co. has been damaged by fire. The company has leased the building formerly occupied by the Ogle Mfg. Co., which it will equip for its own use.

QUINCY, ILL.—An auxiliary high service pumping station, 1-story, 26 x 32 feet, to cost $100,000 will be built by the city. E. R. Chatten is city engineer.

ANDERSON, IND.—The Anderson Foundry & Machine Works is preparing plans for the erection of an addition 80 x 300 feet in size to double the capacity of its plant.

INDIANAPOLIS. — Articles of incorporation have been issued to the Ray N. Moore Mfg. Co. The company's capital is $50,000 and it will manufacture corn planters and machinery. Ray N. Moore, M. Moore and A. W. Caul, Ames, Iowa, are the incorporators.

PERU, IND.—The Model Gas Engine Co. plans to erect an addition to its plant. Cost is estimated at $50,000.

SOUTH BEND, IND.—The Studebaker Corp. has obtained a permit for the erection of a dry kiln, to cost $50,000, to be 112 x 244 feet of reinforced concrete and tile construction.

SOUTH BEND, IND.—A concrete reservoir will be erected at the north city pumping station, to cost $6700.

UNION CITY, IND.—The Tita Engineering Co. has been incorporated with a capital of $50,000 to manufacture automobile parts. Incorporators are L. Leroy Armstrong, W. Frank Roberts and Russel J. Tritt.

WABASH, IND.—The Service Motor Truck Co., which has taken a contract for the manufacture of Liberty trucks, announces plans for the construction of two additions, one building to be 75 x 200 feet, and the other 50 x 400 feet.

BELLEVUE, O.—The Collier Motor Truck Co. will build a 50 x 150-foot brick and steel addition to its plant. R. A. Palmer is general manager of the company.

CLEVELAND.—The Minerva Engine Co. has been chartered with $250,000 capital. Clifford S. Goby and Royal K. Johnson are interested.

CLEVELAND.—The plant of the Ackerman Wheel Co., which has been engaged on government contracts for tractor and airplane wheels, has been damaged severely by fire. Loss is estimated at $10,000.

CLEVELAND.—A charter of incorporation has been granted to the H. D. Wright Mfg. Co., capitalized at $25,000. The company will manufacture furnaces; its incorporators are William H. Marlatt and E. G. Rushford.

CLEVELAND.—The Welding Equipment & Supply Co. has been incorporated with $10,000 capital. The incorporators include R. J. Bishop, W. H. Martin, M. A. Gaxik and others.

CLEVELAND.—The Monarch Brass Co., Payne avenue and East Forty-fifth street, will build a brick factory to cost $50,000. Contract for construction has been awarded to Christian Schwartzenberg & Gaede, 1900 Euclid avenue.

COLUMBUS, O.—The machine shop of J. and W. J. Leukart has been severely damaged by fire.

DAYTON, O.—The Monarch Engineering Co. has been incorporated with $150,000 capital to manufacture tools. The incorporators are F. A. Wagner and F. W. Gruen.

DAYTON, O.—Work will be commenced shortly on a 300 x 600-foot factory to be built by the Dayton-Wright Aeroplane Co. The structure will be one and two stories high and will cost $200,000. H. L. Talbot, City National bank, is in charge.

DAYTON, O.—The Dayton-Ohio Production Co. has been incorporated under a New York charter to manufacture guns and ammunition with $25,000 capital. Incorporators include A. H. Glock, D. W. Morgan and E. K. Hanlon, 610 West 141st street, New York.

DAYTON, O.—The Dayton Automatic Products Co. has been organized with $250,000 capital and is considering a site for its proposed factory. G. C. Hodgson is the company's engineer in charge of construction, which will be rushed as much as possible as the company has undertaken a government contract.

GALION, O.—The roundhouse of the Big Four railway has been damaged by fire and will be rebuilt shortly.

HAMILTON, O.—The Iron City Foundry Co. has been incorporated with $50,000 capital. The incorporators include Albert D. Stuckey, C. E. Freeman, F. G. Traber and others.

HAMILTON, O.—F. Mueller, architect, will prepare plans shortly for a $100,000 factory to be erected by Brandon R. Milligan, Rentschler building.

LIMA, O.—The Lima Rivet & Forging Co., recently organized, has purchased a site and will erect a factory. W. L. Russell is in charge.

MEDINA, O.—The Medina Machine Co., which has recently received government contracts, plans to enlarge its plant.

MANSFIELD, O.—The American Clay Machinery Co., Bucyrus, O., has awarded to the Austin Co., 14320 Euclid avenue, Cleveland, contract for the erection of a plant here. R. C. Penfield is president of the company, which manufactures grinding machinery.

URBANA, O.—The Urbana Mfg. Co. has been incorporated with $50,000 capital to manufacture sheet metal specialties. The incorporators are Harry S. Easton, Frank C. Gaumer, Joseph C. Mackery and others.

TOLEDO, O.—The Acklin Stamping Co., 1645 Dorr street, has awarded the contract for an addition to its plant.

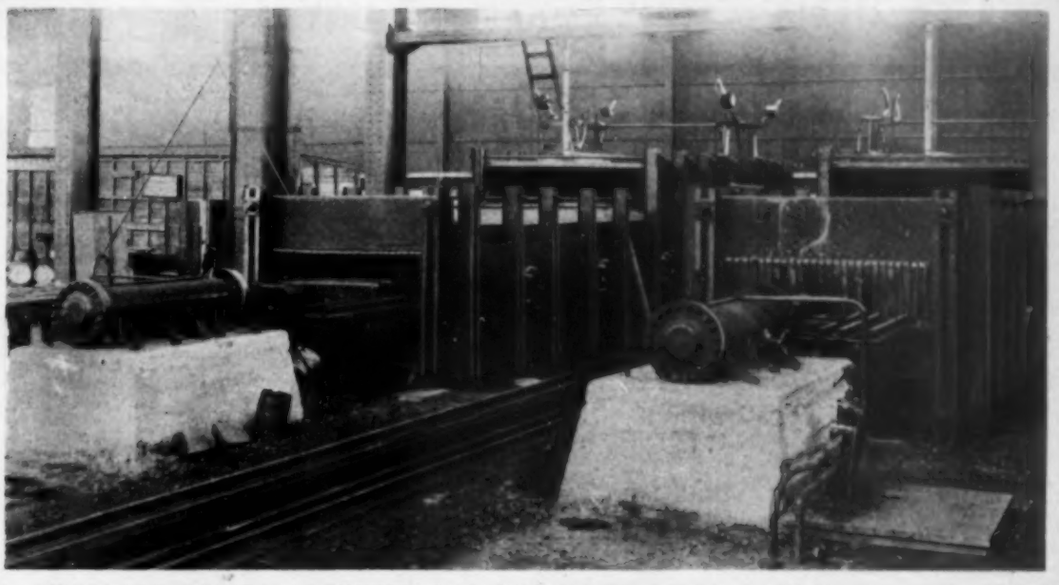
TOLEDO, O.—The Pronovost Torsion Spring Wheel Co. will erect a plant on a 60-acre site recently purchased between Dora and Bancroft streets. The company has offices at 828 Spitzer building.

ZANESVILLE, O.—The machine shop of the Baltimore & Ohio railroad has been damaged by fire with a loss of $15,000.

HUNTINGTON, W. VA.—A large addition will be built by the Huntington Steel Products Co.

PRINCETON, W. VA.—The Virginia railroad will construct a new machine and car repair plant. Raymond Depue, Terminal building, Norfolk, Va., is president.

YORKVILLE, W. VA.—The Wheeling Steel & Iron Co. has purchased 80 acres and will build a number of plant additions, including tin mill and steel plant extensions.



Continuous Heating Furnaces

W-S-M Continuous Heating Furnaces afford a great saving in time and labor which is frequently expended in charging the furnace.

The Heating Furnaces shown above are used for heating blooms, billets and ingots. The pieces are fed onto a platform in front of the furnace and are pushed through the fire chamber by hydraulically operated cylinders, the heated pieces being discharged upon a roller table, which carries them directly to the rolls.

The furnaces may be fired by coal, oil, natural or producer gas.

For Steel Mill Equipment of any kind you can do no better than to specify W-S-M—used the world over.

Principal Products of The W-S-M Company
Steel Plant Equipment:
Manipulators, Furnaces, Charging Machines, etc.
By-Product Coke Oven Machinery.
Shipyard Cranes.
Hoisting and Mining Machinery.
Ore and Coal Handling Machinery.
Special Large Cranes.
Gas Producers, Gas Valves.
Hydraulic Turbines.
Johnson Hydraulic Valves.
Steel Castings.

WELLMAN SEAVER MORGAN COMPANY
CLEVELAND
OHIO U.S.A.

Say you saw it in THE IRON TRADE REVIEW

Up and Down the Pacific Coast

ABERDEEN, WASH.—Manager Ward, of the Grays Harbor Motor Ship Co., announces that a machine shop is to be constructed for installing engines in vessels for the government.

EDMONDS, WASH.—An ordinance has been passed granting to the Washington Coast Utilities a franchise to install and operate an electric lighting system.

EVERETT, WASH.—Plans are being prepared by Burns & McDonnell, engineers, Kansas City, Mo., for a municipal hydro-electric plant to cost $800,000. D. D. Merrill is mayor.

SEATTLE.—The Puget Sound Machinery Depot has obtained a permit to erect a $75,000 warehouse building at 3455 First avenue, south. Plans have also been completed for construction of a 180 x 269-foot boiler shop.

SEATTLE.—Plans for an addition to the plant of the Seattle Pattern & Model Works, Spokane street and Whatcom avenue, are being prepared by architect F. W. Grant, Mehlhorn building, and bids will be called for in about two weeks.

SEATTLE—Francis W. Grant, architect, Mehlhorn building, has been commissioned to prepare plans for the first unit of a group of buildings for the Smelters Steel Co., White building. The first unit will be a 2-story building 100 x 120 feet of frame and concrete construction and will cost about $80,000. Other buildings will be erected as needed.

SPOKANE, WASH.—The Northwest Harvester Co., 3036 Trent avenue, has obtained a permit to erect a $4000 brick pattern shop.

SPOKANE, WASH.—Chief engineer E. S. Clark of the Spokane & British Columbia railway is completing the survey for a proposed road to run from this city to Republic, where a junction will be made with a completed section of the road from British Columbia.

LA GRANDE, OREG.—The La Grande Iron Works will build a plant addition, 40 x 80 feet and will install new machinery for its foundry and iron works. D. J. Fitzgerald is in charge.

PORTLAND, OREG.—The plant of the Cutler Grading Machine Co., Hood River, Oreg., makers of apple sizing machinery, will be moved to this city.

PORTLAND, OREG.—Wilbur E. Coman, president and general manager, Northwestern Electric Co., announces that contract has been awarded by the company for the construction of an addition to its power plant which will increase its capacity 50 per cent. Cost is estimated at $1,500,000.

PRINEVILLE, OREG.—The voters have approved the proposal to build and equip a railroad from the city to the main line by authorizing a bond issue of $100,000.

FRESNO, CAL. — The Pacific & Gulf Electric Co. contemplates additions and extensions to its plant. Cost is estimated at $400,000.

MARTINEZ, CAL.—An election will be held Jan. 22 on issuing $200,000 in bonds to build a waterworks system. Olmstead & Gillelen, Los Angeles, are engineers.

MODESTO, CAL.—The Sierra & San Francisco Power Co. plans additions and improvements to its power plant to cost $25,000.

New Business in Eastern Canada

BRANTFORD, ONT. — The city council has authorized the expenditure of $100,000 for extensions to the waterworks plant and system and proposes to commence at once on the erection of a pumping station. T. Harry Jones is engineer.

COPPER CLIFF, ONT. — The Dominion Bridge Co., Dominion station, Lachine, Que., has been awarded the structural steel contract and the Allis-Chalmers Co., Milwaukee, the converter contract in connection with the extensions planned by the Canadian Copper Co.

DESERONTO, ONT. — The Dominion Match Co. will build an addition to its plant and install machinery to cost $50,000.

DUNDAS, ONT.—The John Bertram & Sons Co., Ltd., has let a contract to the Secord Co. for an addition to its machine shop, 70 x 300 feet, to cost about $150,000.

HILLSDALE, ONT.—Fitzgerald Bros. are in the market for a portable steam engine.

HAMILTON, ONT.—The Rae Machine Tool Works, Ltd., has been incorporated, to manufacture machinery, castings, implements and tools with $45,000 capital stock. The directors are Willis B. Sturrup, John S. Duggan, Craig McKay and others, Toronto, Ont.

LISTOWEL, ONT.—The Malcolm Andrew Furniture Co. will build an addition to its factory and install machinery to cost $7500.

LINDSAY.—The Allen & Hanbury Co., 54 Gerrard street east, Toronto, Ont., will build a plant at Lindsay to cost $100,000 and has let the general contract to Irwin Thompson, 326 Seaton street, Toronto.

PORT COLBORNE, ONT.—A. E. Augustine, Box 116, is in the market for a 15-horsepower electric motor with starter.

OJIBWAY, ONT.—Plans for a municipal water works system have been approved by the Ontario health department.

OWEN SOUND, ONT.—The Union Cement Co. will install machinery in the old Sun building for the manufacture of cement. The new plant will have a daily capacity of 2500 barrels. The company will purchase second hand equipment for the plant.

RENFREW, ONT.—The city council will purchase a pump for the waterworks plant. J. R. Stewart is engineer.

PORT ARTHUR, ONT.—The plant of the Port Arthur Shipbuilding Co. has been damaged by fire with a loss of $15,000.

TORONTO, ONT. — The Swift Canadian Co., St. Clair avenue, is in the market for a locomotive type boiler.

TORONTO, ONT.—The Bond Engineering Works, foot of Cherry street, has awarded contracts for the erection of an addition to its foundry to cost $8500.

TORONTO, ONT.—The Cluff Ammunition Co., 28 Atlantic avenue, will build an addition to its plant to cost $12,000.

TORONTO, ONT.—J. A. Johnston, 171 King street, east is in the market for a portable steam engine.

TORONTO, ONT.—The Swift-Canadian Co. will erect an addition to its cooler plant on St. Clair avenue at a cost of $20,000.

TORONTO, ONT.—The Toronto Hardware Mfg. Co., Ltd., has been incorporated to carry on the business of manufacturer, iron founder and machinist with $400,000 capital stock. Archibald W. Langmuir, William A. J. Case, William M. Smith and others are interested.

WALKERVILLE, ONT. — The Dominion Stamping Co., Ltd., has awarded the contract for a forge shop and is in the market for machinery, including drop hammers. The new building and equipment will cost about $16,000.

WALKERVILLE, ONT. — The Beaver Truck & Tractors Co., Ltd., has been incorporated to manufacture motor trucks, farm tractors, fire apparatus and vehicles with $500,000 capital stock. Edward P. Brownell, Toronto; Charles J. Stodgell and Henry P. Crocker, Walkerville, are interested.

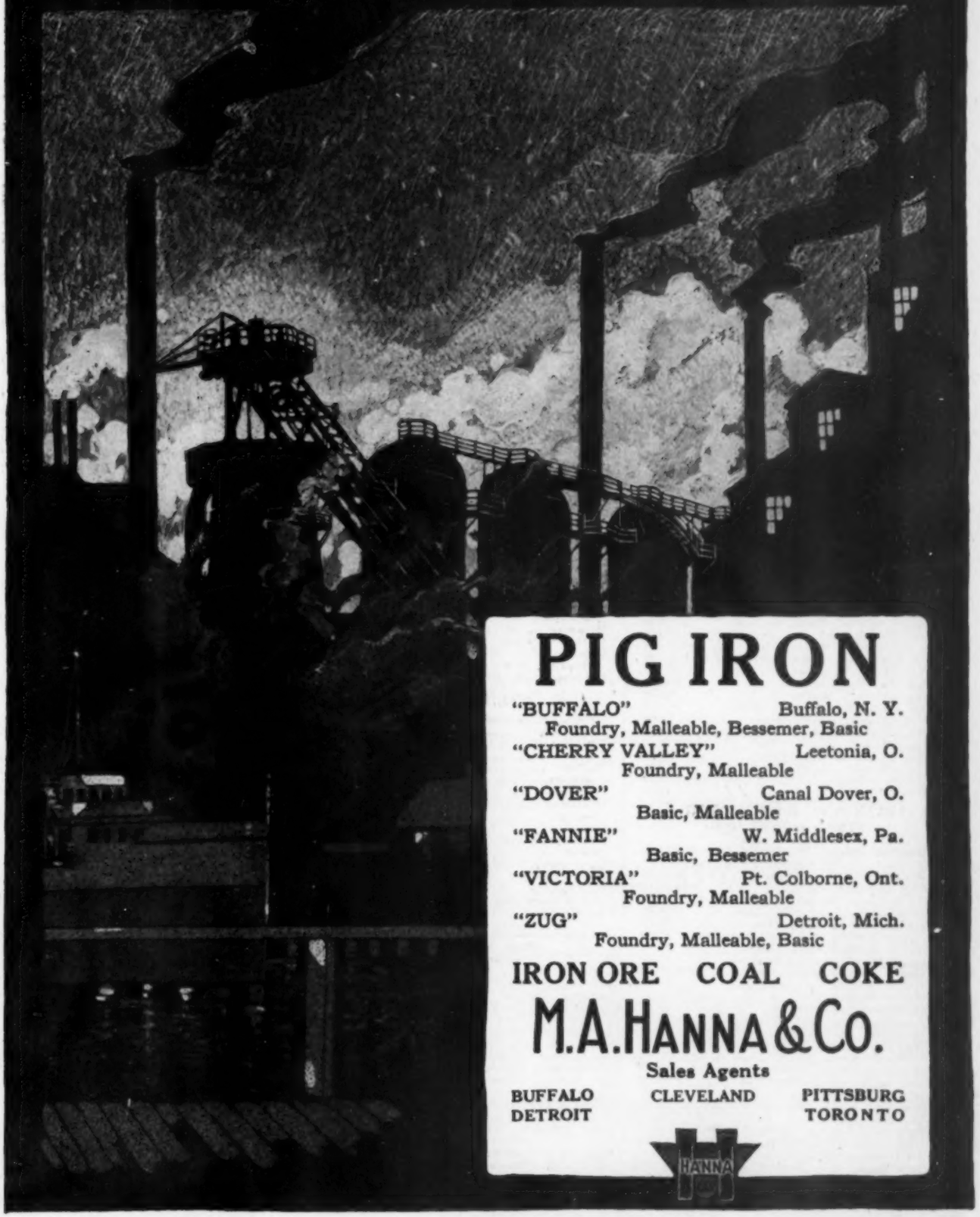
WINDSOR, ONT.—The plant of the Studebaker Auto Co. has been damaged by fire with a loss of $75,000, Dec. 30.

LACHINE, QUE.—The plant of the Rapid Tool & Machine Co. has been damaged by fire with a loss of $55,000. The plant will be rebuilt.

MONTREAL, QUE. — The Canadian Co-operative Marine Corp. has been chartered to build and operate ships with $1,000,000 capital stock. Waldo W. Skinner, George G. Hyde, Ronald C. Grant and others are interested.

UPPER BEDFORD, QUE.—The Torrington Co., Ltd., has been incorporated to manufacture needles, sewing machines and machinery with $150,000 capital stock. Walter R. L. Shanks, Francis G. Bush, George R. Drennan and others, Montreal, Que., are incorporators.

HANNA



PIG IRON

"BUFFALO" Buffalo, N. Y.
Foundry, Malleable, Bessemer, Basic

"CHERRY VALLEY" Leetonia, O.
Foundry, Malleable

"DOVER" Canal Dover, O.
Basic, Malleable

"FANNIE" W. Middlesex, Pa.
Basic, Bessemer

"VICTORIA" Pt. Colborne, Ont.
Foundry, Malleable

"ZUG" Detroit, Mich.
Foundry, Malleable, Basic

IRON ORE COAL COKE

M.A. HANNA & CO.

Sales Agents

BUFFALO CLEVELAND PITTSBURG
DETROIT TORONTO

HANNA

Iron and Steel Prices

Corrected to Tuesday Noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.	
Old range Bessemer, 55 iron	$5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05
Port Henry Ores, non-Bessemer, Per Unit, Delivered Eastern Pennsylvania.	
Old Bed, crude 55 iron	10.50c to 11.00c
Old Bed., concent., 65 iron	11.00c to 11.50c
Harmony, concent., 63 iron	11.50c to 11.75c
Lump (at mines)	$5.75c

WAREHOUSE PRICES

Steel bars, Chicago	4.10c
Steel bars, Cleveland	4.035c
Steel bars, Detroit	4.085c
Steel bars, Philadelphia	4.10c
Steel bars, New York	4.095c
Steel bars, St. Louis	4.17c
Steel bars, Cincinnati	4.085c
Steel bars, St. Paul	4.22c
Steel bars, Buffalo	4.05c
Iron bars, Buffalo	4.65c
Iron bars, Chicago	4.10c
Iron bars, Cleveland	3.985c
Iron bars, Detroit	4.75c
Iron bars, St. Louis	4.17c
Iron bars, Cincinnati	4.085c
Iron bars, Philadelphia	4.50c
Iron bars, New York	4.659c
Shapes, Chicago	4.20c
Shapes, Detroit	4.185c
Shapes, St. Louis	4.27c
Shapes, St. Paul	4.32c
Shapes, New York	4.195c
Shapes, Cleveland	4.135c
Shapes, Philadelphia	4.20c
Shapes, Buffalo	4.15c
Shapes, Cincinnati	4.185c
Plates, Buffalo	4.40c
Plates, Chicago	4.45c
Plates, Detroit	4.435c
Plates, St. Louis	4.52c
Plates, St. Paul	4.57c
Plates, New York	4.445c
Plates, Cleveland	4.385c
Plates, Philadelphia	4.45c
Plates, Cincinnati	4.435c
No. 10 blue anl. sheets, Chi.	5.45c
No. 10 blue anl. sheets, Cleve.	5.35c
No. 10 blue anl., Buffalo	5.40c
No. 10 blue anl., sheets, St. L.	5.52c
No. 10 blue anl. sheets, Cinci.	5.435c
No. 10 blue anl. sheets, St. Paul	5.57c
No. 10 blue anl. sh., Detroit	5.435c
No. 28 black sheets, Chgo.	6.45c
No. 28 black sheets, Cleve.	6.35c
No. 28 black sheets, Cinci.	5.45c
No. 28 black, Detroit	6.435c
No. 28 black sheets, St. L.	6.52c
No. 28 black sheets, St. Paul	6.57c
No. 28 galv. sheets, Chgo.	7.70c
No. 28 galv. sheets, Cleve.	7.60c
No. 28 galv. sheets, Cinci.	6.635c
No. 28 galvanized, Detroit	7.685c
No. 28 galv. sheets, St. L.	7.77c
Hoops, Cleveland	4.885c
Hoops, Detroit	4.935c

IRON AND STEEL SCRAP

STEEL WORKS USE

(Gross Tons)

Bundled sheets, Pittsburgh	$22.00 to 23.00
Bundled sheets, Cleveland	24.50 to 25.25
Bundled sheets, Buffalo	19.00 to 20.00
City wrought, short, N. Y.	25.00 to 26.00
Frogs, switches, guards, St. L.	30.00 to 31.00
Frogs, switches, guards, Chgo.	30.00
Heavy melting steel, Pitts.	30.00
Heavy melting steel, Buffalo	30.00
Heavy melting steel, Chgo.	30.00
Heavy melt'g steel, Cleveland	30.00
Heavy melting steel, Cinci.	27.00 to 27.50
Heavy melting steel, east. Pa.	30.00
Heavy melting steel, N. Y.	26.00 to 26.50
Heavy melting steel, St. L.	29.00 to 29.25
Heavy melting steel, Birming.	23.00 to 24.00
Hydraulic press. sheets, Cleve.	27.50 to 28.50
Hydraulic press. sheets, Pitts.	24.00 to 25.00
Hydraulic press. sheets, Chgo.	27.00 to 27.50
Low phos. steel, Buffalo	40.00
Low phos. steel, Pittsburgh	40.00
Low phos. steel, eastern Pa.	40.00
Shoveling steel, Chicago	30.00
Shoveling steel, St. Louis	27.50 to 28.00
Steel rails, short, Chicago	34.00 to 34.50
Steel rails, short, Cleveland	31.00 to 32.00
Steel rails, short, St. Louis	36.50 to 37.00
Steel rails, old, Birmingham	28.00 to 30.00
Stove plate, Cincinnati	16.50 to 17.00
Stove plate, St. Louis	20.50 to 21.00
Stove plate, N. J. points	19.50 to 20.00
Stove plate, Birmingham	19.50 to 21.50
Stove plate, Buffalo	22.00 to 23.00
Stove plate, eastern Pa.	23.50 to 24.50
Stove plate, Cleveland	19.00 to 20.00
Stove plate, Pittsburgh	20.00 to 21.00
Cast iron borings	11.00 to 12.00

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$21.00 to 22.00
Boiler plate, cut, No. 1, St. L.	23.50 to 24.00
Bundled sheets, Cincinnati	17.00 to 17.50
Knuckles, coup., Chicago	34.00 to 34.50
Knuckles, coup., St. Louis	31.50 to 32.00
Springs, Chicago	39.50 to 40.00
Stove plate, Chicago	21.00 to 22.00

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	3.50
Boston	3.70
Philadelphia	3.30
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	3.10
New York and Brooklyn (rail)	3.10
Virginia furnaces to:	
Philadelphia	$3.27
New England	3.77
Brooklyn, Jersey City, Newark	3.52
Birmingham, Ala., to:	
Boston	6.00
Cincinnati	2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	6.00
Philadelphia (r. and w.)	5.25
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.15
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis-St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	19.5 cents
Philadelphia	18.5 cents
Boston	21.5 cents
Buffalo	16.0 cents
Baltimore	18.0 cents
Cleveland	13.5 cents
Cincinnati	17.0 cents
Chicago	21.5 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	79.0 cents
St. Louis	27 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	75 cents
Pacific coast (tin plate)	75 cents

IRON MILL USE

(Gross Tons)

Busheling, No. 1, Cleveland	29.00 to 30.00
Busheling, No. 1, Buffalo	26.00 to 27.00
Busheling, No. 2, Buffalo	17.00 to 18.00
Busheling, No. 1, Pittsburgh	21.00 to 22.00
Cast borings, New York	16.50 to 17.00
Cast borings, eastern Pa.	19.00 to 20.00
Cast borings, Cleveland	20.00
Cast borings, Buffalo	19.00 to 20.00
Cast borings, Pittsburgh	20.00
Cast borings, Birmingham	13.00 to 15.00
City wrought, long, N. Y.	31.00 to 32.00
Cut forge, Chicago	35.00
Forge flashings, small, Cleve.	25.50 to 26.50
Forge flashings, large, Cleve.	27.00 to 27.50
Forge No. 1, Eastern Pa.	24.00 to 25.00
Grate bars, Buffalo	20.00 to 21.00
Grate bars, Cleveland	20.00 to 21.00
Grate bars, N. J. points	19.50 to 20.00
Iron axles, Pittsburgh	42.00 to 44.00
Iron axles, Cincinnati	42.00 to 42.50
Iron axles, Cleveland	47.50
Iron axles, eastern Pa.	47.50
Iron axles, Chicago	47.50
Iron axles, Buffalo	45.00 to 47.00
Iron rails, Chicago	38.00 to 39.00
Iron rails, Buffalo	37.00 to 38.00
Iron rails, Cincinnati	32.50 to 33.00
Iron rails, St. Louis	34.00 to 35.00
Iron rails, Cleveland	35.00
Machine turnings, Cleve.	20.00
Machine turnings, Buffalo	18.00 to 18.50
Machine turnings, N. Y.	16.00 to 16.50
Machine turnings, Pitts.	20.00
Machine turnings, east. Pa.	18.50 to 19.50
Machine turnings, Birming.	17.00 to 18.00
Pipes and flues, Cleveland	23.75 to 24.75
R. R. mch. cast, No. 1, Buff.	30.00
R. R. wrgt. No. 1, Buffalo	35.00
R. R. wrgt., No. 1, east, Pa.	35.00
Railroad wrgt., No. 1, Cleve.	35.00
R. R. wrought, No. 1, Pitts.	35.00
Railroad wr'ght, No. 1, Chgo.	35.00
Railroad wr'ght, No. 2, Chgo.	35.00
R. R. wrgt. No. 1, Birming.	28.00 to 32.00
Wrought pipe, Buffalo	26.00 to 27.00
Wrought pipe, eastern Pa.	30.00 to 32.00
Wrought pipe, New York	30.00

(Net Tons)

Angle bars, iron, Chicago	$37.00 to 37.50
Angle bars, steel, St. Louis	29.00 to 29.50
Arch bars & transoms, St. L.	42.00 to 42.50
Arch bars & transoms, Chgo.	37.50 to 38.50
Busheling, No. 1, Chicago	26.00 to 27.00
Busheling, No. 1, Cincinnati	21.00 to 21.50
Busheling, No. 1, St. Louis	26.00 to 26.50
Busheling, No. 2, Chicago	17.50 to 18.50
Cast borings, Cincinnati	13.00 to 13.50
Cast borings, St. Louis	16.00 to 16.50
Cast borings, Chicago	17.00 to 17.50
Iron axles, St. Louis	45.00 to 45.50
Iron axles, Chicago	47.00 to 48.00
Machine turnings, Chgo.	17.00 to 17.50
Machine turnings, Cinci.	13.00 to 13.50
Machine turnings, St. L.	16.75 to 17.25
Pipes and flues, Chicago	23.50 to 24.50
Pipes and flues, St. Louis	23.50 to 24.00
Railroad wrgt., No. 1, Cinci.	28.50 to 29.00
Railroad wrgt., No. 1, St. L.	31.00 to 31.50
Railroad wrgt., No. 2, St. L.	29.50 to 30.00

IRON OR STEEL WORKS USE

(Gross Tons)

Axle turnings, Cleveland	$24.00 to 25.00
Axle turnings, Buffalo	26.50 to 27.00
Shafting, New York	34.00
Shafting, eastern Pa.	45.00 to 47.50
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	46.00
Steel car axles, Buffalo	45.00 to 47.00
Steel car axles, Cleveland	45.00
Steel car axles, Pittsburgh	40.00 to 42.00
Steel car axles, eastern Pa.	47.50
Steel car axles, Chgo.	47.50

(Net Tons)

Shafting, St. Louis	32.00 to 32.50
Steel car axles, St. Louis	42.50 to 43.00

IRON FOUNDRY USE

(Gross Tons)

Car wheels, (iron), Pitts.	$30.00
Car wheels, (steel), Pitts.	33.00 to 35.00
Car wheels, eastern Pa.	33.00 to 35.00
Car wheels, Buffalo	30.00
Car wheels, Chicago	30.00
Car wheels, St. Louis	29.50 to 30.00
Car wheels, Birmingham	25.00 to 30.00
Car wheels, Cleveland	30.00
Tram car wheels, Birming.	21.00 to 25.00
Cast, No. 1, Birmingham	25.00 to 27.50
Cast, 1, machy., N. J. points	30.00
Cast No. 1, Cleveland	30.00
Cast, 1, heavy, N. J. points	30.00
Cast, 1, machy., N. J. points	30.00
Cast No. 1 Chgo.	30.00
Cast, No. 1, Pittsburgh	28.00 to 29.00
Malleable railroad, Cincinnati	21.50 to 22.50
Malleable railroad, Cleveland	30.00
Malleable railroad, Buffalo	30.00
Malleable railroad, Pittsburgh	30.00
Malleable railroad, east. Pa.	30.00 to 32.00
Malleable railroad Chgo.	30.00
Malleable, agricultural, Chgo.	30.00

(Net Tons)

Cast, No. 1, Cincinnati	26.00 to 26.50
Cast, No. 1, St. Louis	24.50 to 25.00
Malleable railroad, St. Louis	25.00 to 26.00
Malleable agricultural, Chgo.	24.00 to 25.00
Malleable agricultural, St. L.	23.50 to 24.00

MISCELLANEOUS USES

(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$35.00
Reroll. rails, 5 ft. & ov., Chgo.	35.00
Reroll. rails, 5 ft. & ov., E. Pa.	35.00
Reroll. rails, 5 ft. & ov., St. L.	34.50 to 35.00
Reroll. rails, 5 ft. or ov., Cleve.	37.00 to 38.00
Rerolling rails, long, Birming.	37.50 to 38.50
Locomotive tires, Chgo.	47.50

(Net Tons)

Boiler punchings, Chicago	31.50 to 32.00
Locomotive tires, St. Louis	33.50 to 34.00